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THE JOURNAL OF INDUSTRIAL HYGIENE

AND ABSTRACT OF THE LITERATURE

EDITOR, UNITED STATES
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Industrial Health Hazards

Scope of the Physical Examination in Industry

Industrial Dermatoses, Their Sources, Types and Control

The Treatment of Burns

Industrial Clinics in General Hospitals

Health Education in Industry

Co-ordination of Industrial and Community Health Activities

Malingering—Involving the Problem of Getting the Sick or Injured Employee Back to Work

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NATIONAL SAFETY COUNCIL NUMBER

THIS issue of the JOURNAL OF INDUSTRIAL HYGIENE is devoted exclusively to the publication of papers delivered before the Health Section of the National Safety Council at the Eighth Annual Safety Congress held in Cleveland, Ohio, October 1–4, 1919.

WHAT THE NATIONAL SAFETY COUNCIL IS

THE National Safety Council, 168 North Michigan Avenue, Chicago, Ill., is now the leading organization in the United States for the prevention of accidents in the industries, the streets and the homes. Starting in 1913 with forty members, it now has a membership of over 3700 factories, railroads, insurance companies, technical schools, governmental agencies, etc., employing an aggregate of more than 6,000,000 workers. Its income is derived solely from membership dues. It does its work without asking for profit. It is co-operative, non-political, non-commercial. Practically all the coal mining companies, manufacturing concerns and railroads, both large and small, which have obtained the best results in accident prevention are members of the National Safety Council.

WHAT THE NATIONAL SAFETY COUNCIL DOES

1. Maintains bulletin service. Three posters suitable for posting on bulletin boards, where the messages of care and caution may come directly under the notice of the workmen, are issued each week. One bulletin is issued each week for the executives, bringing to their attention the latest and best plans, methods and ideas for getting the best results from safety work and from other industrial relations activities.

2. Maintains Information Bureau for answering inquiries on all phases of safety work, sanitation, industrial hygiene and other branches of industrial relations. The Council also maintains a complete and comprehensive library on safety which is available to its members.

3. Publishes Safe Practices pamphlets monthly. These engineering studies of industrial hazards are written in plain, everyday English so that they can be understood by every foreman.

4. Lends safety motion picture films and stereopticon slides for use at workmen's safety meetings and other occasions.

5. Provides phonographic safety talks, prepared by well-known safety men, for use in lunch rooms and at meetings of foremen, safety committees, workmen and others.

6. Maintains Employment and Registration Bureau for Safety Engineers.

7. Conducts a Speakers' Bureau and gives training courses for safety supervisors. Also co-operates with technical colleges and universities in presenting safety as part of a course in engineering.

8. Aids in the organization of state and local councils in various parts of the country. At the present time there are thirty-five such state or local councils.

9. Prints weekly news-letter to keep members informed on current events and important matters affecting the safety movement.

10. Conducts the Annual Safety Congress in some large industrial center, where papers and discussions on all branches of accident prevention work are given by experts of national and international reputation and where comprehensive exhibits on safety and other questions relating to industrial relations are shown. The Congress at St. Louis in 1918 was attended by over 1700 persons. The Proceedings of the Congress are printed and sent to members. They contain 1200 pages of information which is invaluable to the person who wants to study safety.

INDUSTRIAL HEALTH HAZARDS*

CHARLES A. LAUFFER, M.D.

Medical Director, Relief Department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

THE human dynamo generates a fixed quota of energy. If speeded up, it stands a determinable overload with immunity; if given rest periods, kept in repair, and properly sustained, the human dynamo will last three score years and ten, probably longer. The overloaded dynamo develops heat, in consequence of which wear and tear is greatly accelerated; if temperature readings show that the dynamo heats up too much, an early breakdown can be definitely predicted. The same applies to the human dynamo in which physical defects and psychic maladjustments, as well as speeding up, overloading, and shortened rest periods, develop "heat," known as fatigue.

Modern industrial developments, collecting vast multitudes of men and women in industrial establishments, bring to the forefront the problem of health hazards. The vast exodus from rural to urban life, during the past generation, forcing into indoor occupation individuals whose ancestors for generations lived out of doors, has further emphasized the problem of health hazards.

A study of these problems is vital to the employee; health, long life, and happiness are involved. It is fundamental to the employer; increased production, diminished labor turnover, contented ranks of healthy, happy, veteran employees — all tending to increased profits.

The employee asks for himself and his sons: Is it a safe industry in which to seek employment? Is there any special liability of incurring a trade disease? Or of suffering early impairment in health? In short, what are the health hazards of this and that industry?

Industrial Health Hazards of Employees

I. The industrial health hazards of the employees may be grouped as arising from:

1. Poisons, dusts, fumes, gases.
2. Heat, humidity, ventilation.
3. Lighting.
4. Crowding.
5. Fire peril.
6. Association with diseased employees.

The Harvard Chart gives a readily accessible grouping of the industrial poisons; a consideration of all of them would be out of place in this connection. Lead, arsenic, and mercury cause definite toxic effects, when absorbed by workers in these metals. The most used poison is lead. Not every employee who handles a paint brush, however, gets lead colic; some paints are innocent of lead, yet employees, who have never touched lead, will bring in diagnoses of "lead poisoning," merely because an attending physician knows they are painters. Lead storage in the tissues may ensue when lead is carelessly handled, yet lead poisoning is practically unknown in large plants handling hundreds of tons of lead every year. The extent of industrial lead poisoning, we know, is much less than some reports would have us believe. Employees who cannot be taught to wash their hands before eating, and who never clean their finger nails, nor care for their teeth, are particularly liable to lead poisoning. Lead cannot be eaten with immunity, within or without the industries, but with individual co-operation, plus careful industrial supervision, the lead hazard can be mitigated. Precautions in handling lead reduce, almost remove, the health hazard from this source. Individuals who have once developed toxic lead symptoms should be given other employment, as the poison is cumulative and is never entirely eliminated, hence relapses readily occur, making permanent transfers to other lines of work necessary.

Persons having a tendency to eczema or furunculosis may develop a skin rash from the solvents employed in removing varnish, shellac, and various insulation dope. Cutting oils, recovered by centrifuge methods, provoke skin infections; forced filtration through successive layers of filter paper removes minute metallic spicules, and filters out bacterial flora that affect the skin. Cutting compounds are often culture media for pathogenic bacteria, and may require sterilization, — by heat, chemical, and

* Read before the Health Section of the National Safety Council, Eighth Annual Safety Congress, Cleveland, October 3, 1919. Received for publication September 30, 1919.

filtration methods. Minute burns from flying hot chips, abrasions by metallic spicules in dirty cotton waste — used in rubbing hands and arms — rough scrub-brushes or caustic soaps may provoke such dermatitis. Every industry has its own problem, or succession of problems, in this line. Persons manifesting such susceptibility should be transferred to other lines of work; some individuals can work in chemicals for months without developing trade dermatoses, while others develop such trouble quickly. When 150 employees are subjected to the identical exposure, and only three develop industrial dermatoses, the factor of personal susceptibility is suggested. Attention to the toilet — thorough, careful cleansing of the skin — tends to reduce industrial dermatoses.

Dusts and fumes are drawn out at their source in the well-equipped modern factory, so that the factory atmosphere is, or can be made, relatively clean. There are justifiable grounds for pride, where a wholesome factory atmosphere is maintained. The competition between factories to make working conditions the best possible has not yet been overworked, and can be promoted to the mutual advantage of both employee and employer. It is up to the initiative of employers, co-operating with architects, ventilating, heating and lighting engineers, and employees' committees, to make working conditions safe from the health standpoint.

Pulmonary tuberculosis should be mentioned, in its relation to dust and fumes. Dusts in themselves are not infectious. Dusty air is not salubrious, but with the dust evil minimized, as in modern industries, there are few occupations that can be condemned as unfit for healthy men.

We are told that guinea pigs, kept in cement mills, develop no calcicosis, and employees seldom do. While the controversy over cement dust still rages, its dangers are less excessive than some have imagined. The dust menace in other trades is, in comparison, relatively negligible. Coal miners develop more or less anthracosis; iron workers may develop siderosis. Marble cutters formerly developed calcicosis, which health hazard is now much reduced by suction devices for the removal of dust at its source. The inhalation of foreign particles — such as coal, iron, stone, textile fibres, animal hairs and furs, grain dust — gives rise to pigmentation of the lungs. This pigmentation in itself is of no consequence and everybody has it to some extent.

Dusts are mostly filtered out in the nose; if the dusts reach the bronchial tubes, they are caught in the bronchial cellular cilia, and coughed up, being expectorated with the bronchial secretions. It is contended that none of the dust reaches the alveoli. Particles that reach the peribronchial lymph-nodes, and the mediastinal lymph-nodes penetrate through lymph channels from the bronchia.

Pulmonary pigmentation and lymph-node infiltration are not dangerous until tubercle bacilli have been implanted. Where has this or that victim of pulmonary tuberculosis acquired his disease? There is no definite period of incubation for pulmonary tuberculosis. So much time elapses between the exposure to the tuberculous infection, and the frank incidence of the disease, that the real source of infection may have passed unobserved. The tubercular area can be walled off for many years, lying dormant all that time, but finally there may occur a dissemination from the old focus of infection. Some observers go as far as to say that the primary tubercular invasion occurs before the fifteenth year, before tissue immunity is established, and that the tubercular manifestations of later life are but recurrences of the earlier tuberculosis.

A survey of pulmonary tuberculosis in a textile industry, in which dust inhalation was the alleged cause of the disease, demonstrated that 85 per cent. of the cases investigated showed a tuberculous near relative, or other immediate household source of infection. The remaining 15 per cent. had a more remote source of tubercle bacilli infection, not revealed in this casual survey. The modern consensus of opinion has declared organic dust harmless; there is, consequently, no tuberculosis hazard from the textile industries. A study of pulmonary tuberculosis incidence on the basis of occupation, as afforded by the great sanitaria at Cresson, Mount Alto, and Hamburg, Pennsylvania, conclusively demonstrates that no occupation is exempt; the great white plague can be fastened on no single industry, nor group of industries.

The classes of employees that recruit the tuberculosis army are chiefly those that have relapses of old tuberculosis; those

with tuberculous wives; those living in houses infected with tubercle bacilli; those that have in other ways been exposed to the insidious, slow-acting infection.

Associating at work, or anywhere else, with persons having active pulmonary tuberculosis is a menace to health. Non-tuberculous employees should be spared the hazard incident to working near employees who are coughing and spitting in the active stages of pulmonary tuberculosis. Health service measures within the industries prevent their employment, and endeavor to isolate employees suffering from active pulmonary tuberculosis and other communicable diseases. As no such supervision is exerted over the home life, street cars, theatres, etc., it follows that the factory environment is relatively free from the peril of tuberculosis, and other communicable diseases.

Tuberculous individuals often gravitate to industries where the jobs are light, and the work within their ability. In the quiescent stages of their disease, these men should be employed. Moreover, many employees work indoors who should work outdoors. The high incidence of pulmonary tuberculosis attributed to certain industries requires appreciative consideration, as an industry is scarcely responsible for an injudicious choice of occupation on the part of an employee, suffering from, or predisposed to, pulmonary tuberculosis.

Tuberculosis is a house disease; indoor life is largely responsible. It cannot be fairly classed as a trade disease. The purely industrial diseases are but a fraction of a per cent. of the sum total of industrial morbidity; they are but a drop in the bucket. The preventable diseases, non-industrial in source, loom large in comparison. Teeth and tonsils, "coughs and colds" cause a hundred times as much sickness in the general industries as do the industrial poisons.

The segregation and isolation of persons with "colds" is considered good practice, as "colds" are "catching." "Coughs" and "colds," moreover, are communicated by crowding together in factories, and susceptibility to such infections is heightened by poor ventilation, drafts, overheating, neglect of humidity control. These problems of engineering, successfully solved, make the factory atmosphere safe and minister to the health and comfort of all persons concerned.

Industrial Health Hazards of Employers

II. The industrial health hazards of the employers may be grouped as:

1. Decreased production; machines lie idle; sick employees are irregular, discouraged, lack "pep."

2. Excessive labor turnover, due to ill health, unfitness for jobs assigned, prevalence of epidemic and infectious diseases.

3. Increased accident compensation expenditures, due to sickness masquerading as injuries. Cases arise daily, where conditions are pathological, but trauma is alleged; or in which a minor trauma has provoked a prolonged period of disability or an unusual degree of permanent impairment follows injuries, not in consequence of the gravity of the injury, but owing to intercurrent disease, or the previously impaired vitality of the traumatized individual.

The government employs only healthy men for the fighting line, whose ability to recover from wounds is 100 per cent. plus. The industries necessarily employ many aged and feeble men, suffering from latent diseases and infirmities, having enfeebled powers of resistance, and incurring delayed recoveries when injured. The industries are consequently entitled to sympathetic consideration in the vast economic problem evoked by injury plus sickness. A term of disability may start as an industrial accident, the trauma being admitted, yet the period of disability is prolonged indefinitely by complicating sickness, due to latent disease, activated by the trauma, or is prolonged by sickness arising from other causes, or from pre-existing diseases, unrelated to the trauma sustained. Fully "fifty-seven varieties" of sickness are presented as industrial accidents in entering compensation claims. Among these may be mentioned tuberculosis; syphilis — in various disguises; rheumatism — teeth, tonsils, gonorrhea, — each contributing their quota. These latent diseases, and others, are readily activated by trauma.

Remedies Suggested

III. Since these health hazards face the industrial manager, what can be done about it? How can they be avoided? Measures to this end are:

1. *Industrial Health Clinics*, group diagnoses; health service measures; repair-

ing defects; reclaiming those disabled by diseases, as well as those crippled, and fitting them into selected positions in the industries; health education.

2. *Legalized releases for defects that cause abnormally long periods of accident disability.* Hernia, varicocele, varicose veins, healed tubercular foci in joints, lungs, etc., valvular heart defects, eye defects, amputations, etc., should be charted, and an employer not made financially responsible for defects and diseases arising from causes unrelated to the employment, nor for aggravations of the same.

3. *Obligatory Post-Mortems.* When the cause of death is in dispute, the report of the post-mortem should terminate the controversy. So many deaths, occurring from pathological causes, but reported as arising from accidental injuries received in the course of employment, make post-mortems essential, if justice is to be done all parties.

4. *Federal Health Charts.* Transient employees lose a day undergoing the physical examination that precedes their employment. A federal health chart, renewed annually, valid everywhere, would be invaluable for the transient worker, as well as for the continuous worker who remains loyally by his employer year after year. The onus of the physical examination should be removed from the industries. Proper placement in industry requires the truth about physical defects. The truth, concealed, works the greatest health hazard to the prospective employee.

An annual health inspection by the staff of a diagnostic clinic for every citizen between 18 and 55 could be achieved under federal supervision. The Surgeon General's office could establish in every community a federal "Good Health" station, emphasizing diagnosis, and could recommend such remediable measures as the health maintenance of every citizen of draft age requires, both for industrial service and for war. The early correction of defects is desirable; the early recognition of incipient diseases leads to successful treatment.

Annual re-examinations would constitute a splendid follow-up system, to ascertain whether recommendations made as to teeth, tonsils, hernia, varicocele, etc., diet, exercise, etc., had been followed out.

Nation-wide federal health service, devoting its energies to diagnosis, would not interfere with existing agencies for the treatment of medical and surgical cases, hence would not in any manner antagonize practitioners of medicine, existing sanitaria, and hospitals. A federal educational propaganda for good health, however, could rapidly reduce the percentage of remediable defectives in the nation by thus recommending and by so arousing public opinion as to enforce remediable measures in the incipient stages of defects and disabilities.

Federal health charts, with photos, finger prints, and complete data of physical findings, would aid employment agents in rapidly placing men in the industries, so that they would stay placed; health charts would not debar worthy men from the industries, but would facilitate in so placing them that their defects and morbid tendencies would militate least against them.

The proposed health charts could be the means of tabulating the availability of men for military service, hence would serve the exigencies of war preparedness when men of draft age are again called out; they would likewise serve the industrial purposes of peace.

The day may be near, or remote, when a United States cabinet officer presides over a Department of Health; or when the Surgeon General of the Army is represented by a personnel as numerous and as widely distributed, as that of the Postmaster General. Federal health charts, however, and the universal diagnostic clinic service which would make such charts possible are, however, devoutly to be desired; and until obtained, physical examination must be conducted within the industries as at present in a fragmentary and incomplete manner — or extended, if possible. If conducted with the frantic haste that too often has characterized these examinations in the past, the same indifferent valuation will adhere to this service as heretofore.

Other Health Hazards of Employees

IV. Employees encounter health hazards apart from industrial service that revert back, affecting their industrial life. Such health hazards may be grouped as:

1. *Inherited Tendencies.* Bad or indifferent physical and mental endowment.

2. *Family Problems.* Unhappy home life menaces industrial safety and health.

3. *Financial Problems.* Worry over bad

investments, high cost of living, wife's or children's extravagance, or other matters, may induce more fatigue than the day's work.

4. *Social Life.* An employee may belong to too many things, and be too popular, losing too much sleep. An employee's occupation may have less to do with his health, and his continued industrial efficiency than the way he spends his evenings.

5. *House Problems.* Individual houses, affording every family its own home, are desirable in sewered towns with paved streets. Crowded tenements and boarding houses contribute to health impairment.

6. *Community Health.* The acute infectious diseases encountered in the industries of any community are a reflection of the diseases then prevalent in that community. Measles, mumps, typhoid fever, scarlet fever, influenza, grip, "colds," bronchitis, pneumonia, smallpox are encountered. Isolated cases of these diseases, sometimes endemics, sometimes epidemics, occurring in industrial plants, are traceable to community sources of infection.

7. *Neglect of Personal Hygiene.*

(*a*) Neglected teeth. The neglect of teeth among industrial workers is appalling. Putrescent stumps, dental abscesses, pyorrhea, and incomplete dentures are common; money is spent more cheerfully for almost everything else than for dental prophylaxis and dental repairs. The teeth constitute the first line of defense in conserving the digestion; swallowing food swarming with myriads of bacteria from putrescent teeth causes indigestion. No man would buy a horse that has lost its teeth. "Life is digestion"; our strength and energy come from our food yet some men are so unreasonable as to attribute their ill health and impaired strength to their work, while neglecting their teeth, thus denying their bodies the rejuvenation that comes from wholesome food, thoroughly masticated, and thereby properly prepared for assimilation.

(*b*) Diseased tonsils. Tonsillar infections, both by local and by referred manifestations, cause much loss of time in the industries. The alleged injuries, in which there are no visible nor palpable evidences of trauma, such as alleged sprained back (lumbago), alleged sprains of shoulder, elbow, wrist, ankle, as well as the several types of arthritis, rheumatism, and neuritis, have the tonsils as possible portals of entry for the infection.

(*c*) The venereal peril. All three venereal diseases, in their infectious stages, should bar employees from industry. Stricture and other complications cause lost time years after the gonorrheal infection has been forgotten. The bone injuries of old syphilitics; syphilitic leg ulcers masquerading as injuries; gummata and sinuses, presenting long terms of disability and arising from slight injuries; serious results in mild eye injuries — all, if recorded in detail, would attest the excessive liability to injury, and the poor recoveries registered by syphilitic patients in the industries. Wassermann tests, as a routine hospital measure, are in order.

(*d*) Physical defects, such as hernia, eye strain, etc., are known to exist and yet repair and corrective measures are postponed.

(*e*) Constipation is woefully neglected.

(*f*) Neglect of home sanitation, ventilation, etc.

(*g*) Balanced diet is unobserved.

(*h*) Deficient sleep.

Most men before thirty are second-raters, or third-raters; physical defects exist, and morbid processes are implanted from early life, frequently before the industrial age. Physical examinations in the public schools are often farcical; many remediable defects are overlooked, those encountered are merely reported to parents who infrequently act upon such suggestions. Consequently, the industries receive multitudes of second-raters, who develop into third-raters, who, had their defects been corrected early and had their mode of life been more hygienic, could give a better account of themselves.

An employee spends only eight or nine hours in industrial service; in his home life, community, and social life, during the other fifteen or sixteen hours of the day, he likewise incurs health hazards. The superior lighting, heating, and ventilating systems installed in many modern factories make these industrial plants more hygienic from a public health standpoint than the homes, movie theatres, and churches, many of which are more crowded and worse ventilated. To be consistent, homes, boarding houses, hotels, theatres, clubs, etc., in which employees spend more hours than in the factory, should be scrutinized and inspected as industrial plants now are, in probing sources of health impairment, and routes of infection from communicable diseases.

The industrial sick rate is augmented by a variety of physical defects, most of which are remediable, and those which cannot be cured can be adequately relieved to enable employees to keep at work, if they so elect. A man must be reasonably healthy to be an efficient worker. A small maladjustment, a minor neglect, will sometimes lead to serious complications. An employee with a toothache, whose attention is thus distracted, will give more thought to his tooth than to his job. An ingrown toe-nail is preventable; through neglect or improper treatment, it may cause lost time. Elementary hygiene, and the proverbial "stitch in time" must be observed if a man in industry, or out of it, is to maintain his health and efficiency.

While there are industrial health hazards, and while the zeal in discovering and eliminating them is commendable, the facts remain that the purely industrial diseases are very rare in the general industries; that preventable, non-industrial ailments are the preponderating cause of sickness disability and health impairment.

Interrelation of Sickness and Accident Disability

The daily contact with industrial disability, both sickness and accident, brings one in touch with their intimate interrelation. Septic absorption from such foci as teeth, tonsils, prostate, accessory nasal sinuses, peribronchial lymph-nodes, etc., causes much of the disability improperly labeled as injury; patients like to be told that their occupation does not suit them, that their work disagrees with them, but they may resent it if told that their teeth need repair, that their tonsils should be removed, that correcting lenses should be worn for their failing vision, or that arch supports are required.

This leads to the question of industrial fatigue. If a man works hard enough and long enough he will naturally get tired. Industrial fatigue may not be excessive, but the fatigue from other sources, combined with the industrial fatigue, may prove detrimental to an employee. For a man to be fair with himself and with his job, he must ascertain to what extent his job is tiring him out, and to what extent his fatigue arises from emotional causes (as domestic affairs, financial cares, worry, etc.); from septic absorption (as teeth, tonsils, prostate, etc.); from physical defects (as eye-strain, impaired hearing, flatfootedness, hernia, etc.); from latent diseases (as incipient tuberculosis, etc.); from acute infections (as grip, nasal catarrh, bronchitis, etc.); from improper diet; from unhygienic home conditions; from loss of sleep; and from other potent factors that may enter into the equation, in the accurate estimation of his total fatigue.

A worker who is constantly fatigued from any cause, or any combination of causes, will lose time now and then from sheer exhaustion. The fatigued worker is more susceptible to infectious diseases, from which he makes a retarded recovery; he becomes more stupid, and because less alert he more readily meets with accidental injury from which he recovers slowly, since he has impaired vitality, and we have injury plus sickness to deal with.

The Industrial Clinic

There being this interrelation of sickness and accident disability, constituting the twilight zone of sickness and injury, it naturally reverts to the industrial clinic to find out the sources of fatigue, to evaluate the factors that contribute to the fatigue total, and to facilitate the recovery of the individual, in the manner indicated by the findings of the inquiry. There arise specialties in industrial practice, when an industrial diagnostic clinic is organized; specialization is needed, employing diversified talent and training, such as required on a hospital staff. Beginnings of the industrial diagnostic clinic are observed at many places; among the specialties now covered are:

(1) Operative surgery, clean.

(2) Septic surgery; it is ill-advised to allow the doctor who treats boils, and infected wounds, to care for fresh injuries, or re-dress clean cases.

(3) Physical diagnosis — special reference to heart and lungs.

(4) X-ray service, developing into an ever larger field.

(5) Dental service.

(6) Pathologist, for sputum, urine, blood, Wassermann examinations, tissue staining, vaccines, etc.

(7) Oculist — injuries and diseases of the eye, and optical service.

In addition to these special lines of medical and surgical service, the works dispensary, as occasion demands, consults with orthopedic and general surgeons, internists,

alienists, neurologists, dermatologists, oculists, ear, nose, and throat specialists, endeavoring to establish correct diagnoses, and to co-operate in every legitimate way with the best available agencies for speedily restoring the disabled to health and to industry. Where the plant employs but few industrial physicians, group diagnoses, the collective findings of a diagnostic clinic, may be accessible elsewhere. The multiplication of such centers, within and without the industries, in the interest of health conservation, is much to be desired.

Community Health

The co-ordination of industrial and municipal health activities, as in Akron, Ohio, offers a solution of the problem of controlling epidemic diseases. With the community health problems solved, the industries will be spared the absenteeism from this cause, and the slackened production incident thereto. The works dispensary can become an out-station of the city Department of Health, with test tubes for throat cultures, so that suspicious throats may be swabbed when the patients are sent home, and no delay be encountered in getting reports on findings to attending physicians.

Social Service Work

The control of industrial health hazards is entirely up to the initiative of the industrial management. Health engineering experts — consulting physicians — specializing in the reduction of the health hazards are being employed by the industries, in conjunction with engineers in associated lines, to reduce these hazards.

Educational effort from within the industries strives to stimulate the initiative of employees into foresightedness along health lines. To what extent the industries can enter into community activities without becoming paternalistic is a debated question which we will not discuss. Model house-building enterprises — helping employees acquire their own homes — building and loan associations, banking, stores and restaurants on the no-profit basis, clubs, social centers, playgrounds, hotels for employees, industrial and technical schools, apprentice courses with technical schooling, athletics, bands, and glee clubs are among the forms of community enterprise fostered by many of the larger industries, and which have the endorsement and approval of employees.

The new spirit abroad recognizes participation in industry as in the nature of a social service; constructive good-will — based on mutual confidence and real justice — alone can operate effectively to solve the problems to which industry gives rise. In the trinity of production, Capital, Labor, and the Community must unselfishly co-ordinate their common functions of serving one another.

There are health hazards within the industries, that industrial initiative should control; within the communities, that the co-ordination of industrial and community health service can control; and within the scope of the individual, there are health hazards which require his personal initiative to combat successfully. With such co-ordinated efforts, the human dynamo will generate energy uninterruptedly; the worker, secure in the enjoyment of a fair share of the rewards of toil, can live to a ripe and honored old age.

SCOPE OF THE PHYSICAL EXAMINATION IN INDUSTRY*

C. D. SELBY, M.D.
Toledo, Ohio

INDUSTRY exists solely for the purpose of converting raw materials into finished products of marketable value. Labor is employed in industry for the assistance it is in the accomplishment of that purpose, and its value is fixed by the skill and facility of its effort in that direction as manifested by the quality and quantity of its output.

Formerly, when labor was plentiful and the margin between the cost of production and a moderate selling price was sufficient to bring a reasonable profit, industry gave but little concern to labor. Workingmen came and went as they saw fit, were hired and fired as suited the fancy of their bosses, or were let out in dull seasons and taken on again when business improved. No well thought out attempt was made to offset unstabilizing influences and practically none to improve skill.

More recently, when labor has become relatively scarce and the cost of production higher, industry has been forced to realize that it has a problem in its labor relations; in fact, industry concedes this to be among the serious, if not the most serious, of its problems. Though old in existence, having been ignored, it is relatively new. Employers do not yet know how to solve this problem. They are groping. They have created welfare departments, employment, service and sociological departments, have sought to amuse, edify and pacify the working people, have divided profits with them and have appointed them to act on joint committees in the determination of policies — with little effect as indicated by the present unrest, the greatest the world has ever known.

Employers are still groping, and they are progressing. Labor turnover has been studied, absenteeism investigated, and the causes of spoilage and breakage sought. Information of value has been gained. It has been learned that the most capable and dependable workmen are those who are healthy, physically competent, and are assigned to tasks they like and know how to do rapidly and well. It has been learned that men, working under pleasant conditions void of undue fatigue and hazards to health and limb, are the best producers and consequently the best paid, are the most contented and valued of employees. Industry is now striving to procure such workmen; if unable to procure them in the usual way, to develop them; and, having them, to retain them by offering favorable working conditions and opportunities for further development and advancement.

The procurement of healthy, physically competent workmen may imply the rejection of those who are not so. However, it does not necessarily follow that such should be rejected outright and deprived of the privilege of gainful occupation. There are positions in industry, in fact in virtually every plant of reasonable size, that people of varying substandard conditions of health and body can fill with efficiency, to the profit of their employers and themselves. For example, defective eyesight may justly disqualify a man from operating a machine that requires acuity of vision, yet permit him to supervise a gang of laborers with competency. Again, a chronic bronchitis may render employment in a foundry hazardous and unprofitable, while in the open it may have no detrimental effect. Even the blind and the legless, the tubercular and the nephritic are capable of productive labor under proper conditions of employment. That only the manifestly unfit and the victims of communicable disease should be rejected, is a growing opinion among employment managers. The procurement of health and physical competency among working people requires that they be selected for and assigned to such jobs as they are or can be adapted to — with rejection a last resort.

The maintenance of a healthy, physically competent force of employees requires that working conditions shall be such as to safeguard health and limb, that workmen shall have knowledge of how best to live and labor in compliance with the laws of health and safety, and that health and limb shall be restored as promptly and effectively as possible after impairments or disease have

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occurred. The service of physicians, originally sought for the treatment of injured workers, has been found to be of use in the procurement and maintenance of healthy, physically competent working forces. Medical knowledge and skill are, therefore, welcome to industry, for anything that is capable of assistance in the stabilization and improvement of working forces is welcome. Because of this, medicine has come to be an important branch in the science of modern industrial management.

The physical examination is the means whereby physicians acquire the information they deem essential to the procurement and maintenance of healthy, physically competent working forces. It is, consequently, the basis of medical knowledge in industry and is fundamental to the successful practice of industrial medicine. The scope of the examination should be broad enough to enable physicians to gather the information that is requisite. This means it should uncover defects and diseases that render employment hazardous to him who seeks it or to his fellow workmen. It should uncover imperfections that contribute to inefficiency. It should uncover diseases and substandard conditions of health. In short, the examination should be such as to divulge the true condition; it should be fairly comprehensive.

Although a complete physical examination, with blood-pressure readings, urinalysis and other laboratory tests, is a desirable procedure to follow in industry, it is not always practical. In the first place, industry has not found it necessary except in unusual cases and, in the second place, industrial physicians are usually too pressed for time to investigate deeply. Experience has gradually evolved four grades of examination, depending upon the objective sought, which in turn is frequently fixed by the policy of the company immediately concerned. They are as follows:

1. *Superficial Inspection.* — This consists of a hasty survey for obvious defects and apparent sickness. It considers height, weight, appearance, deformities, distance vision, hearing, hernia, and occasionally the heart and lungs (stethoscope applied outside of shirt). Its objective is *rejection* of the evidently unfit and exclusion of communicable diseases.

2. *Inspection.* — This consists of a more complete survey. All parts of the body are exposed and their condition noted. Diagnostic instruments are used when in the opinion of the physician they are needed. This is practically an examination — without urinalysis and other laboratory tests. Its objective is *selection and assignment* of workers.

3. *Examination.* — This consists of a reasonably complete survey of the body according to accepted methods, and includes blood-pressure readings and urinalysis. It is virtually the same as the examination required by life insurance companies. Its objective is not only the selection and assignment of workers, but their *health supervision* as well.

4. *Special Examination.* — This consists of all measures that are necessary to a thorough study of the body, including intra-ocular observations, gastric analysis, rectoscopy, cystoscopy, X-ray interpretations, investigations of the nervous system, blood counts, etc. Very few industrial physicians are prepared to make such elaborate and painstaking examinations. Individuals needing them are usually referred to consultants. The objective of the special examination is the *diagnosis* of obscure diseases and pathological conditions. It belongs rather to the realm of internal medicine than to industrial.

Inasmuch as by far the greatest number of occasions for investigation into the physical state of industrial workers occur when they seek employment, the inspection would appear to be the most useful of the four grades. It has the advantage of gaining enough information to enable physicians to eliminate the manifestly unfit, if desired, and to advise intelligently in the assignment of all others, and to do so with a minimum expenditure of time. Furthermore, it secures enough information for physicians to determine which individuals must have additional study, in the form of the examination or special examination, for the intelligent supervision of their health.

To exemplify the author's conception of the scope of examination or, more properly, the inspection, the routine in use at the Toledo plant of The National Malleable Castings Company is outlined as follows:

> The worker is received fully clothed and remains standing until the feet are inspected. He is greeted in a friendly manner, and attempts are made to put him at ease if embarrassed or backward.
>
> 1. As he enters gait, carriage and appearance are observed.

2. He is weighed and measured for height.

3. Vision, both near and far, is tested.

4. The right ear and right side of head and neck are inspected. While this is being done the hearing on that side is estimated by a question in a low voice.

5. This procedure is repeated on the left side.

6. The face is inspected; the condition of the eyes is noted by lifting and depressing the lids; the nares, the mouth and teeth, then also the throat and the anterior surface of the neck are observed.

The worker is requested to remove all clothes from the waist up.

7. The chest is inspected and the condition of the heart and lungs estimated by percussion and auscultation.

8. The abdomen is inspected and the condition of the organs estimated by palpation and percussion.

9. The back is inspected and the posterior aspects of the lungs estimated by percussion and auscultation.

10. The spine is palpated and flexed.

The worker is requested to loosen his trousers and undergarments and let them fall down around the ankles.

11. The external genital organs and inguinal regions are inspected and palpated.

12. The sacro-iliac articulations are examined and the anal region inspected.

13. All extremities are inspected, mobility of joints and condition of blood vessels being especially observed.

The worker is now requested to draw up his underclothing and trousers, after which he is directed to sit down and take off his shoes and socks.

14. The ankles and feet are inspected. If there is any doubt about the arches, impressions are taken.

15. Blood-pressure readings are taken (optional).

16. A specimen of urine is obtained (optional).

The worker is now dismissed. During the inspection as defects appear, the physician is expected to inform the worker of their presence and to give him such advice as may seem wise, an interpreter being used when needed. Special features are emphasized immediately before departure and further advice given if necessary to enable the worker to do his work without hazard to health.

In commenting upon this procedure, it may be said that inspections by this method may be made superficial or thorough, as desired, with minimum expenditures of time and effort. The inspection moves easily, without offense, from the exposed parts of the body to those the blunt exposure of which may prove embarrassing to the worker. It meets the requirements for job placement, and prepares the way for subsequent examinations essential to the supervision of health. When accompanied by appropriate advice, when the information obtained is properly used in assignments to work, and when those found defective are afterwards helped through medical and social service and continued advice — then the inspection contributes to the health, earning power and peace of mind of the workers, and its scope may be regarded as being adequate.

In some establishments applicants for work enter the examining room stripped. If this can be done without offense, the physician's time may be thereby economized to the extent assumed in undressing and redressing. This is an advantage where large numbers are hired, but the tendency of physicians, speeding from one to another, is to slur the educational feature, which is of exceeding importance. On the contrary, if the doctor is forced to wait, he has the opportunity to discuss with the workers their conditions and has, therefore, no real excuse for not doing so.

That which has been said applies to the inspection of men. The inspection of women is quite another matter and, although the same general plan may be followed, considerable tact and discretion must be used. The thoroughness of the inspection must frequently be dictated by discretion, and it is wisdom always to have a female nurse present. Good judgment really indicates that women should be inspected by women physicians.

For the further exemplification of the author's conception of the scope of the inspection, a form which has been devised for recording the information is presented, as illustrated.* This form has been evolved from experience in the physical inspection of schoolchildren, the inspection and examination of applicants for employment and, during the war, from studies of industrial medical departments and the forms used in sixty-four of them. The form will not be described as, with the exception of the code at the top, it is self-explanatory. The code, it may be said parenthetically, is a part of a plan in use at the Toledo plant of The National Malleable Castings Company for determining the kind of operation for which an applicant for work is physically fitted; a description of this plan and an explanation of the code are not appropriate to this discussion. The principal advantages of the form are as follows:

1. It provides for specific mention of conditions most usually found, providing also for the recording of unusual conditions.

* One side only of this form is here reproduced. Diagrams of the human figure with numbered sections are printed on the reverse of the original form.

FORM 273

REPORT OF PHYSICAL EXAMINATION

THE NATIONAL MALLEABLE CASTINGS CO., TOLEDO, OHIO

DATE_____

CHECK No. NAME AGE

FINDINGS: A B C 1 2 3 4 5 6 7 8 9 10

DATE OF EXAMINATIONS																				
CLASSIFICATION	R	L	R	L	R	L	R	L		R	L	R	L	R	L	R	L	R	L
EYES									**INGUINAL REGION**										
11 Defective Vision									55 Inguinal Hernia										
12 Old Injury									56 Inguinal Adenitis										
13 Conjunctivitis									57										
14 Trachoma									**GENITO-URINARY**										
15 Interstitial Keratitis									58 Chancre										
16									59 Varicocele										
EARS									60 Hydrocele										
17 Wax in Ears									61 Undescended Testicle										
18 Otitis Media									62 Epididymitis										
19 Deafness from Other Causes									63 Gonorrhea										
20									64										
NOSE									**EXTREMITIES**										
21 Old Fracture									65 Old Fracture										
22 Obstruction									66 Old Mutilation										
23									67 Varicose Veins										
THROAT AND MOUTH									68 Ankylosed Digits										
24 Pharyngitis									69 Other Ankylosed Joints										
25 Enlarged Tonsils									70 Wrist Deformities										
26 New Growth									71 Flat Foot										
27 Syphilis									72 Bunion										
28									73 Ingrowing Toe Nails										
TEETH									74										
29 Defective Teeth									**ARTERIES**										
30 Malocclusion									75 Arterio Sclerosis										
31									76 Aneurism										
TONGUE									77										
32 New Growth									**BLOOD PRESSURE**										
33 Syphilis									78 Systolic										
34									79 Diastolic										
NECK									80										
35 Goitre									**SKIN**										
36 New Growth									81 Acne										
37									82 Eczema										
LUNGS									83 Psoriasis										
38 Pulmonary T. B.									84 New Growth										
39 Pleurisy									85 Syphilis										
40 Acute Bronchitis									86 Other Infectious Diseases										
41 Asthma									87 Scars or Identification Marks										
42 Emphysema									88										
43									**GENERAL**										
HEART									89 Weight in Pounds										
44 Valvular Disease									90 Height										
45 Myocarditis									91 General Appearance										
46									92										
ABDOMEN									**URINALYSIS**										
47 Enlarged Liver									93 Sugar										
48 Enlarged Spleen									94 Albumin										
49 Chronic Appendicitis									95 Sp. G.										
50 Ventral Hernia									**MISCELLANEOUS**										
51 New Growths									96										
52 Kidney Lesions									97										
53									98										
54									99										

NOTE:—MARK √ TO INDICATE DEFECTS THAT DO NOT REQUIRE MEDICAL MEASURES. X THAT REQUIRE MEDICAL MEASURES BUT DO NOT DISQUALIFY. * THAT DISQUALIFY. DESCRIBE X AND * ON OTHER SIDE, USING REFERENCE NUMBERS AND DIAGRAMS WHERE NECESSARY.

2. It records findings practically in the order of inspection and indicates at a glance the side of the body involved.

3. It permits recording with a minimum of clerical effort.

4. It permits tabulations and compilation of reports with a minimum of medical knowledge and clerical effort.

5. It permits diagrammatic representations of abnormalities and amplified descriptions of special features.

6. It permits the recording of three subsequent inspections in direct comparison with the original.

7. It has a wide range of adaptability in the recording of information secured by means of any of the various grades of examination, except the special examination.

In the use of this form, the physician may himself register his observations or, better, he may memorize the numbers and indicate to his clerk the findings by their number. The latter method is of course quicker and easier for the doctor.

It will be said in closing that neither the procedure for physical inspection, as outlined, nor the form is regarded as final or conclusive or in any sense a finished product. Minor changes and additions are constantly being made in both, as experience indicates their need. They have been presented here to-day primarily for the purpose of exemplifying the author's conception of the scope of the physical examination in industry. It is hoped, however, that their presentation may stimulate this organization to take further steps toward the standardization of the examination and the form, and a promulgation of a better conception of the relation of the examination to industrial medicine and of that to the needs of industry and labor.

INDUSTRIAL DERMATOSES, THEIR SOURCES, TYPES AND CONTROL*

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THERE are two sorts of factors that act in the production of industrial, as well as of other skin diseases: The first are the individual or predisposing factors; the second, the specific exciting causes. It may clear the ground and save time if, before taking up the exciting causes, which are our chief concern, we consider for a moment the first group, the personal predisposing causes.

Predisposing Causes

The predisposing causes are the factors in the personal equation which make the skin of varying resistance in different individuals; and these factors are many:

The protection afforded by the skin varies greatly in different individuals and under different conditions. The youthful skin is more delicate than that of the adult. The skin also has senile changes, which may occur prematurely without reference to other senile changes, that lower its resistance. The woman's skin approximates the youthful skin and is more sensitive than the man's skin.

Local conditions in the skin as, for example, vascular disturbances, may weaken its resistance; the skin in which the circulation is poor is of increased vulnerability. The skin which normally sweats profusely is more resistant to some external irritating influences than the dryer skin but is more vulnerable to other external injurious influences. Previous injuries to the skin as, for example, many reactions from external irritants, may permanently damage its protective quality. The greasy skin of the negro, Mexican, and Indian is tough and can endure exposure to many insults that damage the white skin. Individuals show even greater variation. At one extreme we have the normally tough skin, the resistance of which is remarkable; at the other, we find the individual whose skin is so sensitive that blisters and ulcers are produced by slight blows and pressures, which are harmless to the normal individual.

We also have variable personal susceptibility to irritants. What is one's skin poison may be harmless to another. Everyone knows that poison ivy, for example, is not poison at all to many persons, while in others it produces an inflammation of the skin of extremest severity. We see manifestations of this personal susceptibility to particular irritants constantly in industrial dermatoses. Often, after repeated exposure, the skin will acquire resistance to an irritant. Unfortunately, also, it may become sensitized after repeated exposure, so that we not infrequently see persons suffering from inflammation of the skin from irritants which formerly were harmless to them. These factors of varying susceptibility come constantly into play in industrial dermatoses; and they must be borne in mind as an essential part of the problem whenever we are considering the exciting causes of such conditions.

Exciting Causes

The exciting causes of industrial dermatoses are beyond exact enumeration. These causes, however, may be classified into a few groups, and by briefly considering these we may obtain, perhaps, a suggestive orientation of the subject. More than the briefest consideration of these various groups is impossible within the time of this paper.

The exciting factors of industrial skin diseases may be included in the following classes: (1) heat; (2) cold; (3) weather; (4) posture, friction, pressure; (5) parasites; (6) infections; (7) mechanical and chemical irritants.

Heat

Except as it produces scalds and burns, which are in most cases surgical injuries involving more than the skin, the direct action of heat is not a common cause of

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trade dermatoses. Radiant heat may irritate the skin to the point of producing inflammation — dermatitis — either chronic or acute; we see this, for example, in the form of an eczema of the forearms and face in bakers. Occasionally, after long habitual exposure, heat may produce structural changes in the skin, shown by pigmentation, dilation of the capillary blood vessels and thinning of the skin — a condition that sometimes occurs in stokers whose legs are especially exposed to the effects of heat. Rarely, it excites one of the uncommon skin diseases, such as lupus erythematosus. But on the whole, the dermatoses resulting directly from habitual exposure to heat of endurable intensity are surprisingly few.

On the other hand, the indirect action of heat in producing sweating is a frequent cause of skin disease. The skin sodden with sweat is a vulnerable skin. It chafes and develops eczema; and in it trivial diseases, such as mild seborrheic eczema, become exaggerated into troublesome ones. A habitually sweaty skin is also a favorable soil for bacteria, and infections frequently occur. Pus infections are commonest, resulting in boils, forms of purulent infections of the skin, and certain types of eczema. Other sorts of infections are also not infrequent, particularly forms of ringworm of the crotch and of the hands and feet, which at times become disabling.

It is very difficult to counteract the damaging effects of radiant heat on susceptible skins. Some protection is afforded by covering the skin to protect it from direct radiation, and more can be done by interposing an impervious screen between the worker and the source of heat where this is possible. The bad effects of habitual continuous sweating can be minimized by frequent bathing and other measures to promote cleanliness and by intelligent attention to beginning skin diseases, particularly to beginning infections. The bad effects of sweating are shown chiefly on the hands and feet and in the deep folds of the body. Much can be done to control trouble in these locations by intelligent medical care.

Cold

Prolonged exposure to cold is apt to damage the skin by producing permanent damage to its vascular structures. These permanent changes occur chiefly in terminal areas of circulation, such as the ears and nose, and especially the hands and feet. Everyone is familiar with these manifestations as chilblains, but not so familiar is the condition of chronic passive congestion of the extremities that shows as cold, clammy, purplish hands and feet and is very common in outdoor laborers in rigorous winter climates. It is the same condition as chilblains, but in a lesser degree. It greatly lowers the resistance of the skin and is a frequent predisposing cause of trouble. This condition and chilblains are of so common occurrence that they constitute occupational dermatoses of considerable practical importance.

The early experience of the great war with so-called trench-foot — which is chilblains — has shown that there are several factors in the production of this condition: first, prolonged or habitual exposure to cold, especially if the extremities are covered by wet gloves or shoes which cause rapid loss of heat by conduction; second, hardship in the sense of over-fatigue and failure to get proper food, including at least one hot meal a day; third, the wearing of clothes which by constriction interfere with the return circulation, such as tight shoes or tight gloves. In passing, it may be said that the wearing of puttees which shrink when they get wet and then bind the legs was found to be particularly bad in this respect.

The application of these facts to the prevention of the bad effects of cold of the skin in industry are obvious.

Weather

It may seem to be going far afield to refer to industrial dermatoses that are due to exposure to the weather; but they are a real occurrence. You are familiar with the weather-beaten skin of old sailors and farmers and others whose occupations have kept them exposed to wind and sun and cold for years. The skin is wrinkled and ruddy and rough. In those more susceptible to these influences, the cumulative effects of many years of exposure produce serious degenerative changes. They are results of wear and tear and they cannot be guarded against; but they are truly the result of occupation. Fortunately the skin cancers that result in these cases can usually be easily cured if recognized early.

Posture and the Effects of Friction and Pressure

The familiar calluses and corns and thickening of the hands in workers which occasionally produce disability can only be referred to. More important are the vascular disturbances of the legs which may result from habitual standing and which are a common source of skin troubles. These troubles are due to varicose veins. Varicose veins, and the passive congestion of the skin of the legs which the condition entails, sooner or later lead, almost invariably, to more or less dermatitis of the legs and not infrequently to ulcers. There are some uncommon dermatoses which are occasionally excited by standing; but these are so rare as to be of little practical importance in comparison with the very great practical importance of dermatitis and ulcer in the skin caused by hypostatic congestion.

Varicose veins cannot be guarded against. They may be the result of inherently poor vessels (our blood vessels are very much like rubber tubing and they vary in quality in different individuals); more frequently they are the sequel of disease. Men with varicose veins cannot make efficient workers in standing jobs and should avoid them. They do better in jobs that require a reasonable amount of walking; but they are not good workers even for these jobs. Varicose veins are common in women as a result of child-bearing. Women with this condition are likely to suffer eventually from its effect on the legs and should avoid standing jobs.

Parasites

The damages of parasites to the skin occur in those occupations which involve the collection of groups of men in intimate association, as in work trains and labor camps. Under these conditions, the ravages of vermin are almost inevitable. Fleas, bedbugs, lice and itch are more than an annoyance; they lead to infections of the skin that produce disability to an important extent. For example, in the allied armies on the western front, under conditions of heavy warfare, where measures to control the pests could not be applied, the ravages of itch and lice and the secondary pus infections which followed them, produced more disability than any other form of disease. Practical measures for the control of vermin are well known and they should be applied to their extermination in industrial camps.

The causes to which we have referred above, while they produce a very considerable quota of industrial dermatoses, are relatively unimportant in comparison with the two great causes we have yet to consider — infections and external irritants.

Infections

In the practical consideration of infections of the skin, we will leave out of consideration as one of the factors in their occurrence lowered individual resistance, although this is a factor of importance in infections of the skin, as in infections of other tissues. For infections of the skin to occur, there are at least two essential conditions:

(a) A break in the skin surface through which organisms can find entrance.
(b) The presence of pathogenic organisms.

For all practical purposes, it may be said that an infection cannot occur without a break in the skin. Infections, therefore, occur most frequently in rough occupations because in these injuries to the skin are constantly produced.

Bacteria and other microscopic organisms require for their growth organic matter, either vegetable or animal. Infections, therefore, are most frequent in those whose occupations expose them to more than ordinary contact with organic matter. Pus organisms are everywhere and pus infections occur in all men; but even infections of this sort are much more frequent among those whose occupations are, speaking bacteriologically, dirty. Although pus infections are far and away the most frequent of disabling dermatoses, there is a formidable list of other infections of the skin which occur in industry. These specific infections occur pre-eminently in persons whose occupations bring them in intimate contact with organic matter, whether live or dead, such as manure, soil, grasses and moulds, live and dead animals, furs, hides and hair, meats and fish. These bacteriologically dirty occupations furnish almost exclusively a large group of troublesome and often dangerous specific infections of the skin.

To guard against these specific infections in practice is an exceedingly hard problem. It is the more difficult because these infections are often sporadic and of infrequent occurrence, although in the aggregate they cause a large toll of disability and death. The two essentials in reducing infections are to maintain an unbroken skin, as far as possible, and to prevent infection when breaks occur. It is a matter of practical importance for workers to guard against slight wounds of the skin and, when they do occur, to take proper care of them. Superficial breaks in the skin which are not infected, should be sealed to prevent infection. This can be done by covering them with flexible collodion or with clean adhesive plaster or by a clean bandage. Before sealing them, they should be disinfected.

The industrial custom, now common, of having all wounds disinfected with tincture of iodine might be very well extended to encouraging the use of tincture of iodine in disinfecting all small breaks in the skin. It would be an equally useful measure, I believe, to encourage in workers the custom of protecting, either by sealing or by some dressing, minute breaks in the skin, particularly about the hands. Flexible collodion is as practicable to keep accessible and to apply to the surface as is tincture of iodine; and if the custom were fostered among workers of sealing with collodion minute breaks in the skin, the result would be almost as important as that which has followed the habitual use of tincture of iodine to disinfect immediately trivial wounds. There is one caution that must be used, however, in sealing wounds. Penetrating wounds — that is, wounds going beneath the skin — should not be sealed, particularly wounds from objects which have been in contact with the soil, because of the danger of lockjaw and of other serious infections which occur especially in soil and grow freely only when excluded from contact with the air.

External Irritants

A list of the irritants that produce industrial dermatoses would include practically all known local irritants. Such irritants may be mechanical or chemical.

The *mechanical* irritants are relatively few, but purely mechanical irritants may produce dermatitis as, for example, occurs from prickly or thorny non-poisonous plants or their fruits, and from the siliceous spiny particles in sponges. The origin of such inflammations of the skin may be quite unexpected and difficult to determine, as is illustrated by a baffling epidemic of dermatitis which occurred among stevedores in Bristol, England, and which Wills finally demonstrated to be due to fine vegetable prickles on barley barbs.

But by far the greatest number of irritants that affect the skin are *chemical* irritants. These may be animal irritants, such as poisonous hairs of some caterpillar; or vegetable irritants, such as poison ivy or sumach, or primrose and other poisonous plants; or lacquers; or the dust of irritant woods, as teak-wood. The list of such irritants is long and of practical importance. The chemical irritants, using this term in its ordinary sense, range from the oldest known substances used in industry, such as salt, soap and soda, to the newest, such as T.N.T. and mustard gas. Even to enumerate those better known would make a list covering pages. We see their effects in all grades of occupations from the humblest to the most technical. The damage they do usually expresses itself as a dermatitis — an inflammation of the skin — of greater or less severity. In its slightest degrees it may be only a pinkness or redness of the skin with some itching or burning. It may in other cases be a violent inflammatory process with blistering, swelling and secondary systemic symptoms. In extent, the eruption may affect only a small part of the body surface, or it may be universal. The severe chemical irritants, such as the strong acids and alkalis, may produce complete destruction of the skin with the formation of extensive wounds or ulcers.

In addition to the irritants that produce the usual inflammatory reactions, there are certain industrial substances that produce lesions in the skin which are not of the ordinary inflammatory type. The substances which do this especially are tar, mineral oils and greases and their derivatives, and, perhaps, true fats. The commonest lesions which these substances produce are boils and large crops of blackheads and pustules. Such eruptions are seen not infrequently in men habitually exposed to these substances in their occupations. It is a very interesting fact that similar substances are well-determined causes of skin cancer in workers. Chimney-sweepers' cancer, from irritation of soot, has long been recognized. More

recently, it has been shown that similar industrial cancers may be produced by pitch, tar, paraffin, creosote oils and other coal and petroleum distillates.

The control of industrial dermatoses manifestly presents a great many special problems which vary with the numerous irritants that are involved and with the conditions of their use. Under certain circumstances, practicable measures are available to neutralize the irritants, either before or after they come in contact with the skin. Under certain conditions, it is possible to prevent their effects by the wearing of protective appliances such as ordinary gloves, or rubber gloves, or gloves treated with shellac or other substances to make them impervious. In the manufacture of T.N.T., varnish of orange shellac, which is painted over the hands, forearms and other exposed surfaces, is said to furnish effective protection, and is suggestive of similar protective varnishes that might be devised for use in other irritating occupations. But, of course, the only entirely satisfactory protection against industrial dermatoses from external irritants consists in preventing such irritants from coming in contact with the workers. This may be practicable, or it may be impracticable or impossible. It is sometimes found to be practicable under necessity, where before it was held impossible.

The most practicable way of handling the problem in certain industries is by the selection of workers who can endure, without damage to the skin, the amount of external irritants which are necessarily involved in the occupation. Some men cannot work at all where others can work without damage. My impression is that nothing is gained by trying to keep these susceptible men at work which produces skin trouble. The best thing is for such men to shift their occupation, if possible, when the inability to endure the irritants involved is discovered. When old workers acquire a susceptibility, shifting of occupation may cause heavy sacrifices which they desire to escape. In such cases, unusual precautions and medical care may enable them to continue. But it is usually only at the expense of discomfort and periods of disability.

I am acutely conscious of the altogether general character of this consideration of the subject. My only hope is that it may at least suggest the extent and possibly the importance of the problem. I think these two facts are not generally appreciated. Industrial medicine is so largely concerned with surgical injuries and serious diseases that it has little time to devote to troubles of less gravity. And yet, I believe that the aggregate of distress and disability resulting from such minor troubles as industrial dermatoses is so large that it is a matter of great practical importance and worthy of intensive study. It is unfortunately a matter which has not been given systematic study by experts in skin diseases, either in this country or abroad, with the possible exception of Germany. It is, of course, a matter of thoughtful consideration to every conscientious industrial physician, and of sporadic study by expert dermatologists, when circumstances bring such cases within their experience. The experts in industrial medicine are unfortunately not experienced in dermatology, which is a highly technical specialty.

There is an important field here which is worthy of systematic investigation and which promises important practical results. I believe it would be highly useful if a systematic investigation of this subject by experts were undertaken in this country. One practical way of undertaking it would be as follows:

Employ a few men, who are trained dermatologists, to devote all of their time to an investigation of industrial dermatoses as they occur in our centers. Competent, younger men of this sort could be found, who would be willing to undertake it. Associate with these full-time investigators a consulting board of mature experts in skin diseases who would be available for consultation and advice and for special investigations. Such men are to be found in our large cities and are in practical contact with nearly all industrial centers.

I believe a well-directed investigation of industrial dermatoses continuing for a considerable time, perhaps two or three years, would result in an important addition to our knowledge of this subject — not so much to our knowledge of the diseases, because they are pretty fully and accurately known, but of the factors which are important in the production of these diseases and in their prevention and control. It was found possible to do work along these lines in the handling of very complicated problems of disease that threatened our army

during its mobilization in this country; and I believe such a system could be effectively carried out in studying this problem in industrial life. It could not be so effectively pursued, even by thorough co-operation, by experts who are all in fixed locations. It requires a certain number of them to be mobile, so that their services may be used anywhere. I avail myself of the opportunity which this occasion affords to call attention to this matter as one worthy of being fostered.

THE TREATMENT OF BURNS*

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MOORHEAD, in his *Traumatic Surgery* (1), published in 1917, writing of burns says: "Practically speaking, they should all be regarded and treated as infected wounds due to heat." Colcord (2) in a most careful discussion of burns and their treatment says of a visit to a hospital where there were many burned cases: "Every burned surface was covered with pus and the smell was disgusting. Many writers speak of the absorption of pus from suppurating burns as a frequent cause of death."

Why is it that burns tend to run a septic course? The heat which is sufficient to kill the cells of the skin layers in a third degree burn should certainly be strong enough to destroy microörganisms upon this skin and it undoubtedly does. Thus a burn is an injury to one or more layers of the skin resulting in death of the exposed tissues and readily infected either direct from without or from the neighboring unburned skin. Therefore, if we can keep a burn sterile it should, after the separation of the slough, become a clean granulating wound and follow the same course as other wounds of this type.

While epithelium will grow on an infected surface, its growth is slow and unsatisfactory as compared with its growth over a sterile surface. It is exceedingly difficult to maintain sterility in a burn of any magnitude. Even with the greatest care any wound which is frequently dressed becomes infected and this is particularly likely to occur when a mass of dead and partially devitalized tissue is the type being treated.

In considering the treatment of a burn we have to consider two things, the treatment of the burned individual and the treatment of the local condition, the part burned.

The treatment first should be directly for the burned individual. The conditions to be combated are shock and nephritis. Secondary conditions such as fever and pulse rise with meningeal symptoms, vomiting and diarrhea, and sometimes symptoms of gastric or duodenal ulcer may appear as a result of thrombosis and toxic absorption from the local burned area. These must be met as they arise.

The order of treatment is as follows:

1. Put the patient to bed in a warm room with hot water bags to feet.

2. In removing the clothes, cut around burned areas being careful not to tear the clothes from the skin and cause additional trauma and avenues for infection.

3. Protect the burned areas thus exposed by covering with sterile towels or sheets.

4. Give patient $\frac{1}{4}$ gr. morphine with $\frac{1}{100}$ gr. atrophine by hypodermic. Repeat with caution if necessary. Morphine is a stimulating narcotic and if used carefully can be employed to combat the shock without risk.

5. As soon as possible, start a Murphy drip in order to combat shock and supply fluids to the kidneys.

6. When patient's condition begins to improve, start treatment of the local burned area.

The local treatment of a burn is practically the same for first degree, second degree, and third degree burns. One or all types may occur in any case. The first degree burn involves only the outer layer of the skin, there are no blebs following and no scarring results. The first, last, and only treatment needed in this type of burn is to powder freely with powdered stearate of zinc. When this type merges into second or third degree burns in the neighborhood, the whole area had best be treated with a solution dressing. Before this is applied,

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however, a careful cleansing of the skin with a mild antiseptic is carried out. This must be done thoroughly, but gently, especially around the burned areas. For the skin three or four inches from the burn, benzene applied with cotton mops and followed by 3½ per cent. tincture of iodine is probably the most satisfactory method of sterilization. As we approach the burn, ether should be substituted as it is less irritating. It is applied with cotton mops. The doctor should wear sterile gloves, use sterile instruments, and if he opens blebs should first sterilize the area with 3½ per cent. tincture of iodine. Moorhead recommends puncturing the bleb aseptically at the junction between the sound and unsound skin.

After the surrounding skin has been prepared and the blebs attended to, the burned area should be covered with a suitable sterile dressing. There are three types of dressing now in use.

1. Wet solutions, of which the most favored are 1 per cent. solution of picric acid and saturated solution of bicarbonate of soda.

2. Ointments, of which the most used are boric acid and soda bicarbonate, 3 per cent. There have been a number of special burn ointments developed, two of which have been so thoroughly tried out that their formulæ will be given.

First Ointment. Used by Dr. A. W. Colcord in the treatment of 8,000 burns.

℞

Carbolic Acid
Thymol
Menthol
Camphor of each gr. 5
Ichthyol
Balsam of Peru of each gr. 10
Zinc Oxide
Starch of each 1½ drachms
Petrolatum to make one ounce. Mix well.

Dr. Colcord uses this ointment in 1/6 strength from the start, applied daily with aseptic precautions.

Second Ointment. Used at La Panne, Belgium (3), during the war.

℞

Vaseline	20	
Lanoline	20	
Antipyrine		60
Boric Acid		60
Salol		20
Iodol or Iodoform		20
Phenol		20
Bichloride of Mercury		02

This ointment gave extremely good results and was used with aseptic caution.

3. The third type of primary dressing is warm wax. This method started with the proprietary substance, ambrine, but it has been found that the action is only mechanical so that there are a number of mixtures of paraffin and resin now on the market which are quite satisfactory. One used at the American Steel and Wire Company and at the Norton Company at Worcester consists of

Paraffin	70
White Wax	20
Resin	10

All of the combinations are dispensed in solid form and must be melted before using.

The method of applying the wax is first to dry the skin thoroughly, using an electric blower such as is used in barber shops for drying the hair. After the area to be treated is thoroughly dried, the wax is either sprayed or painted on. Spraying is wholly painless, painting nearly so. The wax must be just liquid before being applied and can best be melted down in a double boiler. When the wax is painted on, sterile cotton swabs on applicators are the best instruments to use. The warm liquid wax should be dabbed on, not "painted." The wax hardens almost at once, forming a smooth coating extending over the sound skin for a short distance on all sides of the burned area. Upon this thin hardening wax layer, sterile sheet wadding which has been dipped in the wax is laid and over this another layer of sheet wadding. The whole dressing is held in place by a bandage. The advantage of using wax is the immediate covering of the burned area with a smooth sterile protecting surface with splinting of the injured part. The wax is removed daily, coming off *en bloc* with the sheet wadding. The secretions underlying it are washed off with normal saline, the area dried with hot air, and a fresh wax dressing applied.

It seems to make little difference which method is used if the work is done carefully and absolute aseptic technique maintained throughout. Personally, the author prefers a sterile saturated solution of soda bicarbonate for the first few dressings. It is easy to apply, gives considerable relief to the patient and requires less technique and handling of the injured area than the oint-

ment or wax. It should be applied by saturating a piece of old sterile sheeting in the solution and wrapping this loosely about the burned area. The moisture is maintained by surrounding the wet linen with oiled silk. The dressing can be moistened from time to time by lifting a corner of the silk and carefully adding the solution.

If there is little sloughing, the ointment or wax treatment can be instituted but if much sloughing is present a moist dressing will be needed. The disadvantage of continuing the soda is that if any infection is present it is liable to flourish in the alkaline medium unless the medium is distinctly antiseptic. For this reason it is well to stop the soda dressing after twenty-four hours and use alum acetate solution.

℞

Alum	pts.	5
Lead Acetate	pts.	25
Water	pts.	500

Dissolve separately and mix.
Do not filter.
Shake before using.

This solution is mild, non-irritating and antiseptic. It has a white precipitate which seems to have a very soothing effect upon the skin. The solution has been used largely at the Worcester City Hospital and elsewhere for burns.

After the slough has separated and granulations begun, the burn may be considered a granulating wound. Three things must now be considered, encouragement of epitheliation, care of the granulations, prevention of a deforming scar.

Epithelium forms from the germinal layer of the skin and its down pocketings, and it is from this layer that fresh epithelium is formed. Three things seem to assist epitheliation greatly: first, a sterile granulation tissue to grow over; second, a smooth surface to grow under; third, pressure.

The difficulty of preserving sterile granulation tissue has been mentioned. If it can be preserved, wax provides probably the best type of surface to grow under. Its chief advantage is the ease with which it can be removed without injury to the newformed epithelial cells. At the Ambrine Hospital in Paris a thin layer of sterile zinc oxid ointment is applied along the epithelial edge further to protect the cells, especially when the hot wax is applied. The cleansing of the wound after the removal of the wax is easy as compared with the cleansing of a wound covered with ointment. However, where there is any tendency to infection of the granulating surface the ointment is probably somewhat preferable because of its antiseptic properties. The importance of pressure in the healing of granulating wounds was first noted by the author when examining a series of burns in the Worcester City Hospital. Burns of the back were in all cases progressing better than burns of the chest or extremity, and it was concluded that pressure was an accelerating factor. It seems to make little difference as to the type of covering which is employed provided it is smooth. Thus sterile adhesive plaster has been used by many, and the author has obtained good results with gutta percha tissue, if there are no wrinkles or air spaces.

Granulation tissue once infected is almost impossible to sterilize, as those who worked in France know only too well. Therefore, the basic principle in the treatment of burns as in all surgery is to keep asepsis of the wound if possible, and, if in spite of all care it becomes septic, endeavor in every way to render it again aseptic. In burns involving a large area, the burned area always becomes infected. This has been strikingly brought out by Fauntleroy and Hoagland in their recent paper in the *Annals of Surgery* (4). In cases of this type it is obviously impossible to expect to obtain sterility. The method used in treating these very extensive and difficult burns, employed by these authors and also favored by Moorhead, is the open-air treatment without any dressing at all. Massive crusts form over the burned areas and beneath these pus forms plentifully. Cases seem to do a little better if the crusts are not removed, but gently lifted when absolutely necessary to give drainage.

The crust forms a dressing very similar to paraffin. Fauntleroy and Hoagland in discussing the treatment of these crusts say, "There seemed to be two separate, distinct periods, at which time two distinct results occurred simultaneously in all cases. The first period in which removal was continuously followed by the same heaping up process. The second period in which following a week's period of non-interference, removal at this juncture of the crust with the application of a thin smear of boric ointment on lint was followed by a quick bridging over of the raw surface with new

skin and complete healing with no scar formation in a few days' time."

To sum up: While it should be possible to maintain sterility in burns, this is difficult and, where large areas are involved, almost impossible.

In treatment the individual should be treated first, the burn, second.

The treatment of the burned area may be divided into the primary treatment which consists of cleansing and the application of a moist dressing, and the secondary or more permanent treatment when open air, special ointments, solutions, or wax may be indicated.

Experience tends to show that absolute standardization of treatment is impossible in the secondary treatment as burns react in different ways. It would be advisable, however, to restrict the drugs and ointments to a minimum number and study each one carefully in order that a certain type of standardization may be obtained.

Emphasis should always be laid upon strict aseptic technique without which good results cannot be obtained.

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INDUSTRIAL CLINICS IN GENERAL HOSPITALS*

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CLINICS in industrial plants for the immediate care of injuries and medical ailments have become of undisputed value and laws are even being passed to require them. They need no argument now with those of open and educated mind and I have no need to discuss them as they are outside my personal field. The character and extent of the service that they will render may ultimately go far beyond what is now done in most plants, though this is of course a very debatable question since it is by no means certainly desirable, and because it conflicts with the established interests of medical practitioners. But however far this may progress, general hospitals will for an indefinite time to come, if not always, be the centers for groups of experts in the various clinical and laboratory lines that are now essential in the diagnosis and treatment of patients and in the study of problems of health. Individual industrial establishments can scarcely be conceived of as having, each within its own employ, a group of leading men in all the various lines of clinical and scientific medicine. Hospitals, particularly those connected with medical schools and with the staffs that the latter have, will always, therefore, need to be centers for the study and treatment of difficult cases and for the investigation of problems, however far health establishments in industrial plants may progress.

At the present time, however, the general hospitals receive and they will long continue to receive not only complex cases but the every-day routine sort of case for ordinary diagnosis and treatment, and they have in their clientele, all told, a greater number of industrial workers than any other organized establishments for the care of the sick. In performing their simple daily round of duty then, as well as in acting as consultation centers, the hospitals cannot give proper service unless they have on their staffs persons familiar with industrial hazards and their results, who will be alert to recognize these and capable of determining their importance or insignificance in individual cases. Let us contrast this matter with others that are comparable. No hospital is capable of giving what is now recognized as good diagnostic or therapeutic service to patients with infectious diseases, for example, unless it has available the men and the equipment for expert bacteriological work, any more than it could give good surgical care without surgical equipment and expert surgeons. Although not a separate science like bacteriology but a work based upon various sciences, the study and recognition of the hazards of industry and their effects is a clear-cut and well-defined type of work. Its problems are quite as definite as those of bacteriology and, while they are even more varied and complex, the nature of many of them and the method of attack upon them are clearer and, in expert hands, more likely to be successful.

The possibility of an industrial origin of health disturbances and the need of determining this point comes up, too, in the great bulk of the hospital clientele; in fact, its possible importance needs to be considered in a far larger number of cases than does any other health factor. In the first year that our industrial clinic at the Massachusetts General Hospital was so organized that it received the greater part, at least, of those patients who might be suffering from effects of industry and in whom this needed to be determined with care and through trained and intelligent inquiry, over 5100 persons were sent to this clinic for investigation; of this number, approximately one-tenth showed actual results of their work of dominating importance in explaining their ill health. In most of these instances the question could not have been settled, and in those in which there was a relation the relation would have been overlooked, had the investigation been done in the customary way by persons who had not accumulated interest in and extensive knowledge of the possible relations of the patient's job to his illness. This is clearly shown in our experience in that time in lead poisoning. A special search was made for lead poisoning in all persons in whom care-

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ful inquiry showed any exposure to lead. Ordinarily the poisoning is looked for only when either the hazard is obvious and commonly known or when the symptoms clearly suggest it. The difference in method had the result that the same number of lead cases were found in one year by special search as were diagnosed in five years by the ordinary methods, and this in the same clientele coming from the same general line of industries.

A considerable trial of a special industrial clinic in a general hospital and of other well-defined methods of attacking the problem of the relation of industry to general medicine has convinced me that no other method than a special clinic goes so far to insure good service to the patients, and no other method so stimulates and enlightens the interest of the hospital staff in general in this important health factor. Likewise, by no other means is it possible to group the cases together in such manner that the results of study can be analyzed and made available, and in no other way does there occur such an accumulation and repetition of experience as to make evident important problems that had been unrecognized or had seemed of little significance.

To be really useful and successful several things appear to be necessary. The clinic should be in charge of a physician whose greatest interest is in the work, and he should be on sufficient salary to enable him to spend most or all of his time at the work. This is necessary in order that he may properly develop his clinic and may be free to make many visits to factories, in order to accumulate constantly increasing knowledge of industrial processes, and in order to determine day by day whether in doubtful cases seen in the clinic the work really explains a part or the whole of the effect upon health. Much of his time will be needed also in making studies in the clinic, in factories and in the laboratory, of the problems that are frequently suggested, and in this he will have many opportunities to keep occupied voluntary or paid assistants. Another essential element in the clinic's success will be a trained social worker who is familiar with factory conditions and industrial processes as well as with general social conditions. Through her will be best handled many of the social details of the records, and she will be able to investigate both home conditions and factory conditions in order to provide the essential knowledge of the relative bearing of the home and the factory upon the health of the patients. Such a small, paid staff is necessary for success. From this it may easily be enlarged with voluntary or paid workers as occasion demands.

Furthermore, a method must be adopted which will make sure that all cases with interesting or suggestive industrial relations get to the clinic. It will not suffice to depend upon workers in the medical, surgical or other clinics for sufficient interest to refer cases either spontaneously or upon request. They usually do not recognize the hazard or its relation to the patient, and in the pressure of their own work they frequently forget to send any that they do recognize. We have, with some success, adopted the plan of having a social worker, who is sufficiently instructed in industrial hazards to serve in this way, stamp the cards of all new patients as they enter, if their occupations come within a list furnished her or if they otherwise seem interesting. Whatever other clinics they go to, patients must, when so designated, go also to the industrial clinic before leaving. The other social workers in the various clinics are also instructed to send to the industrial clinic any cases showing points of interest in relation to industry. Cases that are primarily of industrial interest, especially certain groups that are being particularly studied in the industrial clinic, are transferred to that clinic for regular care; others are simply referred for diagnostic, therapeutic or preventive advice while their management is continued in the other clinics.

Carried out consistently in this way, the clinic will, in any large out-patient department, have abundance of material both to provide wide experience in industrial effects upon health and also for study of the problems that local industrial activities furnish. Some of these problems will be already known; some will become apparent from time to time as a large number of people pass through the clinic and the possible relation of a job to a disorder becomes emphasized by repeatedly meeting the possibility.

The primary value of such a clinic has been, in my mind, the better care of the patients. Equally obvious are the opportunities for furnishing new knowledge, and thus improving conditions through care-

fully planned studies and through accumulation of records and analysis of these.

Likewise important to a hospital that has relations with a medical school, is the opportunity to train all students into an appreciation of the relations between varied industries and medicine and to give special and detailed training to undergraduates or graduates who wish to become especially qualified in the medical service of industry. The latter students can be given thorough knowledge of a limited number of hazards through serving temporarily in one or more plants. In no other way, however, than in such a clinic, so far as I know, can students so well be given a comprehension of the extremely numerous and varied hazards they should be prepared for, and then have opportunity to observe in factories a considerable number of types of these hazards and the methods of controlling them. By serving with the staff in an industrial clinic and in the factory visits to which the work in the clinic leads the staff, students get a wide general training in elementary knowledge of industrial hazards, which would otherwise be obtained only slowly, laboriously and unsystematically.

In addition to those mentioned, however, we have found other and not unexpected sources of interest and helpfulness arising through the clinic. Diagnoses made in individual cases or advice given to a patient have often been transmitted to an employer, with the result that he has thereby first recognized the existence of a particular hazard in his plant or first seen how it may be controlled. Employers have frequently extended the advice to cover all men exposed to the hazard, or have investigated conditions not previously studied, or have sought further advice from us or from others. This has been especially true of the small employer who has but slight or no health service in his establishment, but it has repeatedly occurred with large plants as well.

Labor unions have also at times come to us for health advice because some of their members have been in the clinic. Fairly and tactfully carried out, the relations with labor unions may be made very useful in furthering industrial health, among other reasons because a clinic in a general hospital is obviously not subject to the suspicion that the unions unhappily often have toward the health service in their own industry.

The largest possibilities of useful development lie, however, in the research that can be carried out if the clinic acts as a center for co-ordinating the problems unearthed in it, with the health and technical departments of the industries on the one hand, and on the other, with the men and facilities found in medical schools and hospitals. There are, all told, among these two groups and their equipment the possibilities of attacking all sorts of problems and not infrequently of solving them. Research developments which will control or do away with hazards are, of course, in the long run far more important than the diagnosis and treatment of a group of cases, important as the latter is. In the past, problems in pure physiology, problems in metabolism or in biochemical matters, toxicological problems, problems of general hygiene and sanitation, and various other problems have appeared desirable as a consequence of observations in the hospital clinic. Some of these studies have been carried out with our colleagues in the medical school and hospital, in spite of the heavy pressure of war conditions. Studies have also been made in co-operation with physicians in charge of large plants and several corporations, some of them very large, have offered the co-operation of any portion of their research departments in working out the technical industrial end or the engineering aspect of some hazard, the existence of which was suggested by observations in the clinic.

In this way, as in most others, our clinic as well as our whole method of attack upon industrial medicine, from the hospital or from the academic standpoint, is really in its infancy, but progress thus far seems to open a vista of real public service if the varied departments of hospitals and medical schools can develop cordial co-operative relations with the health departments and technical departments of industries. Unlimited possibilities of good results with satisfaction and credit to both sides seem open, and the problems and the opportunities for interesting and serviceable work grow constantly as one studies the matter.

HEALTH EDUCATION IN INDUSTRY *

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IN the fight against premature death and disablement due to accident, injury, and illness, progress is being made in certain directions but not in others. The bacterial diseases with the exception of pneumonia, bronchitis, and influenza have been very greatly decreased. The death rate of infants and older children from all causes has been greatly decreased. These two decreases have been considered enough to lower greatly the death rate. Heart disease, Bright's disease, apoplexy, and diabetes have very materially increased.

We attempt to make a distinction between diseases due to habits and those due to customs. For instance, the bacterial diseases in the main are spread by community customs. The habits of the individual are of lesser importance than the mass habits called customs. On the other hand, in the case of diabetes the larger factor is the habit of the individual. While many flaws can be picked with this classification, in the main it serves to make a useful distinction with a reasonable degree of accuracy. Applying the rule, we find that in the main the diseases which are on the increase are those due to faulty habit. Another line of division would be on the basis of organized effort at prevention. Applying this rule broadly we find that the improvements have been in that group where preventive effort has been made and the lack of improvement has been in those where there has been neglect.

When we come to study accident rates we find that there has been a tendency upward for fifty years. The fatal death rates from all external causes by decades in Chicago since 1867 have been

1867–76	93.2
1877–86	90.6
1887–96	122.6
1897–06	106.3
1907–16	120.8

The rates for 1917 and 1918 were 118.1 and 99.8 respectively.

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Suggested Changes in Classification of Accidents

In an effort to analyze these figures I have come to this conclusion. In the rearrangement of the classification of the causes of death it would be wise to divide external causes into those where there is intent to injure and those without intent. The former are not related to carelessness. In this group there should go suicides, homicides, and legal executions — Numbers 155, 155a, 155b, 155c, 155d, 156, 157, 158, 159, 160, 161, 162, 163, 177, 182, 183, 184, 186a — eighteen causes in the Bertillon classification responsible for more than one-quarter of the deaths due to external causes.

I suggest that when the next revision of the Bertillon classification is being considered you be represented and that you endeavor to bring about such revisions in the nomenclature and classifications as will make it easier to marshal the facts relative to accidents. Also that you have proper governmental agencies collect and tabulate non-fatal accidents.

And now, returning after the digression, we find that the tendency of rates for deaths from all causes to rise is due to a rise in the rates for homicides, suicides, and what have been termed public accidents, and that this rise has been enough or more than enough to compensate for the decrease in industrial accidents. Between 1913 and 1917 the number of fatal accidents in industry fell from 25,000 to 22,000 — an improvement of 12 per cent., and the number of serious accidents from 700,000 to 500,000, and the number of accidents serious enough to keep a man from work six weeks or more from 300,000 to 26,000 — a fall of 26 per cent. This improvement was due to education of both employer and employee and the use of safer types of machinery.

During the last seven years the employer class has become greatly interested in accident prevention, the employee class moderately so, but the interest of the general public has lagged far behind. In 1917, of the 77,000 fatal accidents in the U. S. regis-

tration area, 55,000 were outside of industrial plants. Of the 510 fatal accidents in St. Louis in 1917, 400 were outside of industry. Of the total death rate from all causes in the registration area of about fourteen, a little more than one, or one-fourteenth of the whole, is due to violence. In 1901–1905 the violence rate was 101.7; in 1906–1910, it was 1.07. Since 1910 it has been: 1911, 1.04; 1912, 1.04; 1913, 1.08; 1914, 1.02; 1915, 0.99; 1916, 1.05; 1917, ?

As a sidelight showing the importance of fatal accidents in determining the total death rate, I call your attention to the attached table. This table shows the death rates per 1,000 from disease and from accidents among employees in the Canal Zone, between 1906 and 1907, and compares them with the fatal accident rate in the registration area in the United States. At one time the fatal accident rate in Panama was four and one-half times that in the United States. It is even yet one-third higher. The death rate from disease fell from a maximum of 40.5, thanks to intelligent, well-supported effort. The very high fatal accident rate fell only from 4.52 to 1.35 minimum. I hope when we come to build another canal we will have an accident prevention policy comparable to the disease prevention policy employed when the Panama Canal was being dug.

After showing the steady decline of accidents in industry between 1913 and 1919, Payne says, "There is another story for public accidents or accidents occurring in the home, on the street, and generally outside of industrial establishments. There has been a marked growth in the number of this type of accidents in the past few years. The reason for this rapid increase in the number of public accidents, while the industrial accidents have as rapidly declined, is that industrial managers are thoroughly aroused to the necessity of accident prevention in their plants but the public in general is still unconscious of the significance of safety."

To bring about the desired ends it is not enough to inform and instruct. That does not go far enough. The habits of the people must be changed. Each person must not only know what practices are safe and what are hazardous but he must apply such knowledge to himself. While his mind runs in its proper grooves and his muscles are doing their customary work,

TABLE SHOWING NUMBER OF EMPLOYEES, DEATH RATES FROM ALL CAUSES, DEATH RATES FROM DISEASE AND DEATH RATES FROM EXTERNAL CAUSES AMONG THE EMPLOYEES OF THE PANAMA CANAL ZONE, 1906–1917 INCLUSIVE

Year	No. employees	Death rate	Disease death rate	Death rate external causes
1906	26547	41.73	39.66	2.07
1907	39238	28.74	25.44	4.30
1908	43891	13.01	8.68	4.33
1909	47167	10.64	7.55	3.09
1910	50892	10.98	7.50	3.48
1911	48876	11.02	7.65	3.38
1912	51852	9.26	6.36	2.81
1913	56654	8.35	5.24	3.11
1914	44329	7.04	4.40	2.64
1915	34785	5.77	4.05	1.72
1916	33176	6.03	4.58	1.45
1917	32589	7.09	5.74	1.35

Note the following points:

1. The personnel referred to were almost all adult males.

2. Negroes predominated.

3. The work was done largely out of doors with heavy machinery. The climate was unhealthy but the efforts to control disease were exceptional. (In none of the reports is there any stress put on accident prevention.)

4. The fatal accident rates of 1908 (4.33) and 1907 (4.30) were higher than the disease death rate of 1915 (4.05), and only 1.44 per 1000 less than the death rate from all causes in 1916.

5. The death rate from disease after 1911 was exceedingly low.

6. The death rate from accidents was very high every year.

7. The improvement in the death rate from disease is far greater than the improvement in the fatal accident rate.

8. Dr. Gorgas explains that the very high death rate from disease in 1906 was due in greater part to an epidemic of pneumonia.

9. The rapid rise in the death rate due to external causes in 1907, he explains, is due to more blasting and railroad work.

10. In 1906, he says, there were 35 deaths among the white employees of which 19 were from disease and 16 from violence.

there must be a subconscious realization of hazards and an instantaneous response to stimuli of danger. It may be that a tendency to go about in an absentminded trance must be corrected or that a naturally poor inco-ordination and clumsiness must be overcome. This is the problem. How can it be solved ? The solution when found is to be applied to the employer group including general managers, superintendents, and all bosses; the employee group includ-

ing all who feel no responsibility for others; and the general public. The employer group are very well informed but many are indifferent for one reason or another. At least many do not act at all and others act somewhat thoughtlessly. The employee group are less well informed and less interested. The general public are most in need of information and of interest.

Recently a great professor in a great university wrote as follows of personal hygiene: "Personal hygiene is not a subject that can be advanced by public meetings. It has to be worked out by (or with) each person individually." A good answer to this opinion appeared in the headlines of a daily paper issued about the time this letter was received. It read: "Dress designers call for larger hips this season. Checks and stripes and lots of yellows appear to be favorites."

When fashion decrees that hips are to be larger, hips will be larger, or that checks, stripes, and lots of yellow are to be worn, you may be sure they will be worn. It will scarcely be denied that fashion determines wearing apparel, clothes, shoes, the shape of the feet, in great measure the food and the methods of its preparation, and in some measure hours of sleep. Now no one will contend that fashion is worked out by or with each person individually. An impulse, and not infrequently a convention of the interested, issues a decree and forthwith the civilized world obeys it. There is no other field where there is so little individuality, so little work by or with the individual.

All of the items specified in the above paragraph — clothes, shoes, food, sleeping hours — are matters of personal hygiene. Now personal hygiene is a matter of good habits on the one hand or bad ones on the other, and so is safety work when viewed from the standpoint of the general public. Personal hygiene and accident prevention are cut from the same cloth. What I have said about personal hygiene applies to accident prevention. If there is no field for any but individual effort in personal hygiene, the same holds true of accident prevention. On the other hand, if public work pronouncements, feats, discussions, newspaper articles, and publicity can effect changes in matters of personal hygiene, they can be effective in accident prevention.

I agree that the most effective method of education is by personal individual work. I am for it as strong as any one. But it has limitations which make it impossible as a solution of our difficulties. It is tedious, expensive, and requires too much machinery to be practicable as a means of meeting the whole situation. There are great possibilities for the group method even in educating adults. I propose to discuss some phases of some of the group methods.

Education of Adults

Moving Pictures. — This method of education is so well understood by you that I need not say much about it. Let me offer you this suggestion. Try one short run of lessons in a program of lighter stuff. When Health Commissioner of Chicago twelve years ago, I found that evenings devoted to health talks and health pictures lost their pulling power, whereupon I sent around to the moving-picture places single reel health films to be run unannounced between two numbers of the regular program, the audience being assembled with no thought of a health reel and in the main indifferent to such a subject.

Cards, Bulletins, and Booklets. — I recently read a criticism of the propaganda cards of the Chicago Health Department. For example, such a card as this — SWAT THE FLY, or this: DIRTY AIR MEANS DEATH. The particular card objected to was one saying that any sore throat was liable to be due to diphtheria bacilli and calling for a throat culture in every such case. The card was one displayed in street cars. The criticism was that the statements should have been qualified, that more information should have been conveyed, that brief, dogmatic, pragmatic statements were always inaccurate. Of course the criticism was justified. The Chicago Health Department recognizes this. They would not offer this card as a treatise on diphtheria. On the other hand a treatise on diphtheria has no place in the advertising space of a street car.

Once a pedagogue criticised a statement of mine to the effect that I was educating people, stating that I was instructing them. As I understand it, the word-sharks say that a man instructs when he imparts information but that he does not become an educator unless the instruction imparted "changes the ways of those who receive it." Now an essay on diphtheria is instructive but the chance that a street-car card will cause somebody to change his

ways is much greater if it uses a few words and perhaps a picture to put over a message. There is a place for the longer treatise, the essay. The whole question is one of salesmanship. Here are some men with information — the goods. Here are a lot of men in need of the goods but not especially anxious to buy. How can the goods be sold? That is the question. As I see it, the place of the complete treatise is for distribution among the leaders. The others will read it or understand it. The purpose is to instruct the leaders, with a view to having them translate the information, precept, point of view, into the psychology of the followers. The purpose of the short statement is to arrest the attention and secure the adoption of the man who is not greatly interested, who will not give attention for long, who will not make fine distinctions and who will not try to remember.

Slogans. — The men who advertise goods know the selling power of a slogan. Slogans to be effective must be short, catchy, and easily remembered. They must be positive. Negative slogans are not so effective. They must imply action. *Swat the Fly* fills all the indications well. *Do Not Spit* does not. In making cartoons, size of type, color schemes and pictures are matters to be carefully thought out. The use of slogans comes under a well-recognized principle of advertising. In the words of Lord Fisher, "Reiteration is the secret of conviction." It is well to change cards frequently as to location, type, color schemes. We become inattentive — blind to anything that is steadily before us. So much for the cards.

In between the cards and the booklets there comes a place for the leaflet. As to the leaflets I have certain suggestions to make. The fundamental suggestion is that you bear in mind the psychology of the men to be approached, giving it preference over the subject matter to be presented. The following suggestions are based upon this. Use should be made of the universal love of gossip. Wherever it is good judgment, bulletins should say something about individuals using names, addresses, and incidents, news of the plant. Incidents and occurrences should be made the basis of stories. Records of accidents should be published, making use of the spirit of competition. Advantage should be taken of symptoms, disorders, diseases, and accidents to distribute leaflets. There should be a series, with one for each group of subjects. I get between 50 and 100 letters a day. An analysis of these letters shows that for every one interested in prevention there are ten interested in the cure of a developed disorder — the actual figures being 66 and 660. This shows that the overwhelming interest is in developed conditions. "The devil was sick — the devil a monk would be." Although I write most about hay fever in the spring, nine-tenths of the people who write me about hay fever write well after the onset of the hay fever season.

Most diseases of the degenerative group are the result of bad habits. The most effective way to write about a given bad habit is to tie it up with some disease which grows out of it. Take one illustration. Tell the news about some person with diabetes, then touch on diabetes in general and finally expatiate on the habit of excessive sugar and bread eating; or give the news of some accident, tell of accidents of this type and then dilate upon carelessness. These make ideal presentations. In these longer presentations I can see no objection at all to exciting controversy.

Recently on successive nights I went to a forum where the room was crowded as it always is, and to a meeting of the board of directors of another forum called to discuss the advisability of discontinuing because of lack of interest and non-attendance. The reason for the success of the first was knowledge of salesmanship; of the failure of the latter, lack of such knowledge. I asked the platform manager as to the reason for his success. Among other things he told me was this: Always start a row. Always make somebody mad. Meetings thrive on controversy. Occasional bulletins containing controversial matter are in line with good salesmanship.

The approach to foreign language speaking people is at once easy and difficult. They do not read English and most of them read very little in any language. But this very fact means that their minds are not dulled by a multitude of impressions. Anything that you can get across goes big. Slogans are usually slangy. Slang does not translate well. Prizes for slogans in tongues other than English will bring forth some that are catchy for foreigners.

I suggest that concerns employing foreign-speaking people use the newspapers of those people for accident-prevention education. They read their newspapers through even to the advertisements. I sug-

gest that in matter written for these newspapers there be some stories written with the thought of harmfulness, of carelessness, and the benefit of caution inferred constituting the accepted key thought, yet nowhere stated. I suggest that in these articles suggestions of control and compulsion be minimized.

Speakers. — Since so many foreign-speaking people do not read, it might be well to employ some pensioners and disabled men as conversers, talkers — a functionary corresponding somewhat to the Jewish *schnorrer*. Go among the men and subtly talk the harmfulness of accidents. But the larger field for personal and oral presentation will be lectures and demonstrations. Many of you have made very efficient use of lectures, illustrated and non-illustrated. Let me suggest that you vary your method occasionally by introducing a brief lecture unexpectedly into a program arranged on a basis of entertainment solely. Thus you will secure a little of the time and thought of the indifferent. Such a lecturer, remembering the lack of interest of most of his audience, will do well to speak briefly, epigrammatically, making use of catchy, easily-remembered phrases.

Still-Life Pictures. — On the market there are now several automatic projection machines. These can be used to advantage if their pictures and texts are frequently freshened and if the location of the machines is changed occasionally.

Talking Machines. — Occasionally advantageous use can be made of talking machines. For instance, short talks by Judge Gary, Mr. Rockefeller, Lloyd George, President Wilson and the presidents of great corporations would prove effective.

Expositions, Museums, and Kindred Methods. — Of service in educating employers are museums of safety and other permanent exhibits, such as the display in the rooms of the Illinois Labor Bureau. Hazardous machines with dangerous parts may be advantageously set in rest rooms.

So much for the education of adults — always a difficult thing to accomplish, expensive and wasteful.

Education of Children

The education of children is a far more satisfactory field. I have read with interest *Education in Accident Prevention*, prepared by Dr. E. G. Payne upon request of the National Safety Council. It is a guide-book for teachers. In other words, it may be considered an excellent work for the education of teachers in the teaching of accident prevention. The U. S. Public Health Service and various state boards of health have prepared text-books on health subjects to take the place of ordinary readers. As I understand it, none of these have ever come into very wide use. Teachers have explained to me that they must use the adopted text-books and no book agents ever attend the meeting of the adoption boards to secure the adoption of these free health readers. If you go into the text-book field there is but one way to do and that is to play the game as it is played. It might be advisable for you to consider co-operation with the health people in the production of readers, spellers, and other texts making use of such stories as you could furnish as material for the books.

There is a general agreement among teachers that teaching should deal more with the experiences of the day. Even first and second readers would be more interesting if they carried some experiences from the workshop and the home rather than many of the stilted, far-away stories now carried. But when you get into this field, if you do, play the game as it is played.

Payne says while industrial accidents are limited very largely to adults, the same is not true of public accidents. In 1916, 10,534 children under 10 years of age in the registration area were killed by accidents, with perhaps 250,000 others severely injured.

Discipline. — This is a good place to say that discipline is a most potent factor in the prevention of accidents. Childhood is the time to teach discipline.

Workmen's Compensation. — Far and away the most potent educational influence in accident prevention was the passage of the workmen's compensation laws. The placing of accidents on an economic basis was directly responsible for much of the result. A great part of its effect came through creating a background for the National Safety Council and its superb educational work. Thus indirectly and directly workmen's compensation was responsible for the Safety First movement. Personally, I would like to see the application of the same principle to prevention of accidents in fields other than in industry and to the general prevention of disease.

THE CO-ORDINATION OF INDUSTRIAL AND COMMUNITY HEALTH ACTIVITIES*

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IN the early history of medical service in industry the employment of a physician in a plant was considered an evidence of a benevolent attitude on the part of the employer. The protection secured against excessive costs resulting from accident and injury, the shortening of the period of disability, the relation of the doctor to relief agencies and the doctor's value as an intermediary in industrial relations established more or less the value of the plant physician as a member of the operating staff; and as a result of really meritorious work on the part of a few pioneers in the field, it became evident that pre-employment examinations, as well as periodic re-examinations, prolonged the usefulness of the employed both to the industry and to the individual, to his family and therefore to society.

Probably the greatest opportunity for the promotion of the public health has arisen through the rapid development in industry of medical departments — manned as these departments should be by medical men giving their full time and thought to the conservation of human lives. In the discussion of our subject, a review of the relationship of the public health department, of the medical profession and of the public would seem, perhaps, profitable.

Public health is a field which embraces sociology, engineering, chemistry and bacteriology, as well as medicine, and the man with administrative gifts may have qualified for his post through any one of these allied sciences. The fact of a man's being a competent physician does not make him a qualified health officer. Public health is a science and art in itself and peculiar to itself, the essential being that the official should have studied and practised this science and art. If he be a medical man, his position, with the present professional viewpoint, is strengthened with his profession and with the public.

As Drake has well stated, a health department, in performing the functions imposed upon it by law, must reach, more or less directly, every person within its jurisdiction. The past generation has witnessed radical changes in the theory of preventative medicine. Officials are no longer permitted merely to meet emergencies as they arise. Health promotion has become more important than disease prevention, and disease prevention has come to be more regarded than disease suppression. The archaic policy of acting only in the development of emergency, of merely being ready to make the best of a bad situation in repairing damage after it has occurred, has been relegated to a less enlightened day. In carrying out its work of prevention, a health department must endeavor to arouse the interest and attention of individuals rather than of the masses or classes. It has become axiomatic that the government relation can only be as strong as the individuals who constitute it; but it must be borne in mind that public health is a matter for state and the nation — not merely individual towns or cities, and the war experiences demonstrated that disability, preventable in character, is far more prevalent than we have been conscious of or willing to admit.

An aggressive health department employs every possible means of publicity — the public press, as well as the other agencies of which I shall speak later — in an effort to maintain a personal contact. Unfortunately public health publicity costs money and, to be obtained, must be paid for. The controllers of the public purse strings have not yet arisen to the importance of this function, and, excepting in the few instances in which private funds are available for the promotion and support of publicity, the endeavor has failed. The success or failure of any endeavor for the betterment of public health depends, to a great extent, upon the attitude of the medical profession. In the main, that attitude is sympathetic and encouraging. However, there have been measures of very decided public value involving principles of social and economic worth that have been so strongly opposed that their value has been

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lost to the community. The canons of the medical profession provide that the first duty of the physician is to the individual, whereas in preventable diseases, the first duty is to the public.

Throughout a relatively brief but active relation with the medical profession it has been observed that the individual doctor has been so occupied with the specific case that he has all too frequently permitted others to direct the social, economic, and professional adjustments that modern progress has made necessary — this, notwithstanding that the professional interests and those of the public are identical and should be solved and applied only by a socially-minded medical leadership. The present day is intolerant of isolation from affairs. With others, the doctor must become active and not only support and direct actively but create those remedies for the ills of society with which he is or should be familiar. Unless medicine does this and makes apparent its group strength before the people, the people will all too frequently be victimized by the various cults and pseudo-medical interests that quickly grasp the importance of public control and especially with legislative and governmental interests.

Science has developed facts that have afforded remarkable opportunity to progress, but, in so doing, serious obligations have been imposed upon the doctor. Changes in health administration have, at times, been radical, perhaps revolutionary, but no more radical and no more revolutionary than the changes that have come to our scientific thought. The modern health administration, in asking much, is likewise giving much to the physician. The individualization of health work, instead of threatening the material interest of the doctor, actually benefits him in many ways. The more intimately the individual doctor becomes acquainted with the aims and purposes and underlying motives of the modern health department, the more valuable his influence becomes to the people of his community and the more useful the department becomes to him in the pursuit of his practice.

Health officials are now urging periodical physical examinations for all persons as the means of detecting insidious organic diseases in their incipient and easily curable stages, and while the medical profession may be called upon at certain times to render service gratuitous, or with small direct return, in such examinations for the purpose of education and demonstration, it is true that the establishment of this excellent custom is not only likely to save or prolong the lives of thousands, but in the ultimate brings largely increased returns to the physician. The more people think health and talk health, the more generally they seek medical counsel and guidance, consequently the more generally the physician is employed. It is invariably true, whenever there are established anti-tuberculosis leagues, with their dispensaries, medical nursing service, together with the educational and publicity campaigns essential to their success, those medical men specializing in tuberculosis, as well as the general practitioner, have an increased clientele among those actually suffering from tuberculosis and seeking treatment for it, as well as those who come to think seriously of their own physical condition on account of the agitation of the subject. This is similarly true in communities in which campaigns against venereal diseases have been undertaken. In such communities the venereal specialists and general practitioners report an increased demand for this service and, of course, this means that the uninformed have not sought the advice of the advertising or itinerant quack. This well illustrates the fact that that which is best for the people of the community and that which may be over-insistently urged upon them, redound to the material advancement of the reputable physician.

The physical examination of schoolchildren with the discovery of the enormous number of defects of the upper air passages of the ears and mouth, heretofore regarded as relatively harmless, has conferred enormous physical benefit to the community as well as to the financial state of the medical man. This same helpful attitude is maintained by the diagnostic laboratory in its relation with the medical profession. While such laboratories are maintained for the benefit of the people as a whole, the service of the laboratory is rendered almost wholly through physicians. Occasional specimens are received from laymen but the name of the attending physician always accompanies the specimen, and a report sent to the physician, and in practically every instance it is found that such specimens are sent with

the advice of the doctor. In the case of Wassermann tests, it is doubtful if the laboratory ever received a specimen, except from a physician. This is similarly true of specimens from patients suspected to be suffering from diphtheria, typhoid and the other communicable diseases. In actual practice the laboratory is maintained wholly for the convenience of the medical man, saving the individual hours of labor and no inconsiderable outlay of money and if one may judge by the increasing demand for laboratory service, this convenience is becoming generally appreciated. On the other hand, the more generally the members of the medical profession engage in modern health activities in their own community, the more quickly they utilize the service of the staff of the several divisions of the department, the more constantly they employ the services of the laboratory for the exact diagnoses, the greater assistance they are rendering the government in meeting its obligations to the people.

The closest possible relation should exist between the private or industrial physician and the public health official. Public health departments heretofore have been limited in their relations with individuals for the purpose of teaching personal hygiene. The industrial health department can be made the new and strong arm of the public health department in bringing about precaution in matters of health. Morbidity statistics not now available may be secured, as well as organized assistance in times of epidemic.

The demand for this sort of service by the far-seeing executive, unappreciative of the necessary qualifications of a medical director capable of undertaking the responsibility, has led many medical men, the recent graduate, the unsuccessful or moderately so, into the field of industrial medicine; but until qualified men are created by university training or long and varied experience, the cause of industrial medicine, and in turn of industry itself, will not obtain the largest measure of benefit. It no longer suffices for an industrial organization of any size to employ a part-time physician who utilizes his job to pay office rent or automobile upkeep. The physician who considers accident work or casualty surgery as a mere " pot boiler " or " stop gap " for a period of financial stress will hardly prove ornamental to his profession.

To meet the present-day requirement of a medical director it seems that the following qualifications, in addition to a medical degree, are essential:

At least five years of general practice — in that a knowledge of man and his foibles may be acquired. During this period it is necessary that the future industrial physician should maintain a connection with the public health agencies, such as the city health department with its various dispensaries, the general dispensary, and other public medical service, in order to develop the social viewpoint as well as to broaden professional skill.

The industrial physician should have a knowledge of practice, not necessarily profound, of the fundamentals of industrial relations and these include applied preventative medicine, medical and psychopathic medical investigation, recreation, accident prevention and the methods leading thereto.

He should have knowledge of the special problems relating to the employment of women and children; some knowledge of pensions and insurance, including liability, group and social; some knowledge of plant organization, which is likely to prove effective in dealing with the problems of labor.

He should have knowledge of employment methods; some notion of job analysis, physical and mental tests, to determine the fitness of applicants; knowledge of race problems, knowledge of industrial training, apprenticeship, continuation schools for training in particular jobs; and at least some knowledge in relation to the cost of living according to local standards.

He should have knowledge of the hours of work in relation to fatigue and output; knowledge of shift systems, rest periods, regularity, absenteeism, etc.

He should have at least a superficial knowledge of the security and continuity of employment in slack seasons, while convalescing from accident or disease, in case of labor-saving improvements, as well as with the advent of old age.

He should have a general knowledge of physical working conditions, safeguards, disagreeable gases and dusts; heating, lighting, ventilation, locker rooms, wash rooms, rest rooms, restaurants, hospitals, laundries, toilets, showers, plant beautification, drinking water. Of course he should be responsible for the physical examination of applicants and the periodic re-examination of employees, as well as the medical attention to families of employees when such is supplied.

He should have very definite knowledge of housing, transportation, recreational and educational facilities; the transfer and replacement of misfits, or as has been said " fitting the square peg to the round hole."

He should be familiar with the follow-up work, especially among new employees and with the injured; the replacement of injured and crippled employees.

He should have at least some knowledge of the athletic and social activities, company stores, com-

missaries, the type of house suitable for economic administration and housing problems generally.

He should be familiar with labor turnover and its cost; designs and data for the construction and operation of hospitals, lunch rooms, neighborhood and community houses; general education and Americanization, together with a knowledge of broad methods of raising the standard of employees' living conditions and ideals.

In the foregoing I have perhaps wandered far afield with the object, however, of indicating that the medical man with a broad view and such knowledge, however general, will be of such great value to the organization and every person in it as to command the highest respect, wield a constant influence, find his post seeking him, and incidentally name his own salary.

With the broadening of concept, a few plant service departments have extended this field by supplementing a series of lectures, or by other means, bringing attention to the various phases of preventive medicine, emphasizing their social and economic value.

That which has made America great in industry is her faculty of bringing together energies hitherto rambling and misdirected into a rounded concrete whole with largely amplified production. The mainspring of production or success is individual action and not state action. Success is nothing more nor less than opportunity for the individual. The enlightened business man of today sees clearly that the measure of his success is almost directly in proportion to the degree of opportunity his operation creates for others. But of what value is opportunity, lacking its essential adjuvant —the individual in good health ?

In the United States there are 1,500,000 people constantly sick with preventable diseases, and 8,000,000 men between the ages of 18 and 45 are physically or mentally subnormal. While most of us are born with good health, we have but a brief existence before we carry within us, or are exposed without to the agency of our destruction. From a recent report by Irving Fisher of Yale we are informed that there are approximately 3,000,000 persons in the United States suffering from some form of sickness, of whom 1,100,000 are in the working or productive period of life, three-fourths being actual workers who must lose at least $700 per year, which aggregates $550,000,000. The expense of medicine, medical attention, hospitals, extra food, etc., at least equals this amount. Thus we have a total cost of illness amounting to $1,100,000,000 at least one-half of which is preventable.

The sick man is a burden to the community, while the well man is an asset. Out of every hundred who are 25 years old today, thirty-six will be dead at 65, fifty-three dependent upon relatives and charity, six self-supporting and only five well off. It has been shown that of families dependent upon charity 77 per cent. of the members were physically unfit.

A most effective method of reaching the employee and his family is through the house organ, which, if well edited, is a welcome visitor to the domestic circle of each employee. It is well, of course, that the printed column should be supplemented by presentations by the medical staff of the organization, who should reach groups of employees orally or directly, as opportunity may offer, by means of the stereopticon or the motion picture. It has been my practice in lecturing to groups of employees and their families to discuss industrial medicine in accordance with the following scheme, closing the course by discussing problems and hazards peculiar to our own industry.

Physical examinations— their immediate and remote value — are considered by likening the human body to some well-known machine or device in the plant and demonstrating the analogy between the wornout and exhausted parts and the organs of the human body, emphasizing the vital importance of maintenance and repair. This method can be readily applied to such organs as the kidneys, lungs, liver, circulatory apparatus, etc. The acute and chronic infections, whether of industrial or general origin, and their importance are pointed out.

The subject of *personal hygiene* is simply presented, utilizing the diseases or defects that have come to recent attention in the plant as a basis for illustration.

The subject of *sanitation* is presented systematically by following the plan of organization of modern health departments and their various divisions; for instance, the department of sanitation. The discussion includes the nuisances: sewerage and sewage disposal; garbage, its collection and disposal; domestic animals, flies, mosquitoes, etc., together with the importance of good housing and the effects of bad housing and lodging houses. The spot

maps made by health departments indicating the highest tubercular rate, the highest communicable disease rates (excepting perhaps typhoid fever), the greatest juvenile delinquency, crime, drunkenness, and so on through the entire category of social ills, match exactly the spot maps indicating the greatest housing congestion.

Some years ago the Department of Health of Cleveland, through Miss Cadsey, made a study of two districts, one being in the old crowded section of the city and the other in an outlying section, Newburgh way, which is composed largely of employees of the steel mills. Rents were practically the same. In the first district in 1907 to 1914, there were 980 cases of tuberculosis recorded, 52 per 1,000 of population. In the second there were 450 cases, or 28 per 1,000 of population. In the first district in 1912 there were 665 of communicable diseases, or 3 per 1,000. In the second, 286 cases, or 1.29 per 1,000 of population. From the foregoing, little computation is required to fix definitely in dollars and cents the higher value of life in the uncongested section.

It must be borne in mind that a house is not a mere place for shelter. It must provide that which will promote efficiency in labor and strength of character and citizenship. The house connotes the family; the family and not the individual is the unit of our civic structure. It is now well recognized that in the modern factory, at least, the employee is in a better environment than in his own home. It seems the height of folly for industry to expend many times the per capita cost of health administration on the maintenance of healthful surroundings in the factory and permit the ostensible beneficiary to return to a home environment carrying the elements potent with destruction to the individual worker, his children and posterity.

Under the head of *communicable diseases*, prevention, treatment and a simple discussion of antitoxins, vaccines, their manufacture and use, the length and importance of quarantine, etc., are considered. *Venereal infections* and their effects, heretofore shrouded in mystery and crime and not discussed with candor and intelligence, are discussed freely, as they have now come to be recognized as the most important of communicable diseases. This subject almost always enlists and holds the attention of an audience. It is amazing that the average individual knows so little or nothing of the remote effects of venereal infection.

Tuberculosis presents a wide and interesting field. Its relation to housing, overcrowding, food, hours of labor, fatigue, rest, sleep, etc., are pointed out.

In connection with *child hygiene*, in addition to the child itself, pre-natal care, reference to obstetrics, obstetrical procedure and infant feeding are discussed. The value of the medical examination of children is emphasized. *Industrial hygiene* is intimately related to child hygiene, yet when children leave school and enter active life the health authorities lose sight of them. Industrial hygiene is an important feature in public health work and it is plainly the duty of some authority to supervise these young men and women during the early period of their industrial activity.

Under the heading of *food and dairy inspection*, the production, cooling, handling, shipping, storage and delivery of milk, together with the food value, the importance of bovine tuberculosis, the dangers of the unsanitary market, and the handling of food in the home, are referred to.

In connection with *vital statistics*, birth registration and its importance invariably attract attention.

The *laboratory* affords opportunity for a simple discussion of culture taking and examination of diphtheria, typhoid, gonorrhea, syphilis, etc. These subjects always enlist the closest attention of an audience. A description of the examination of water and its importance is also interesting.

These and other health department activities, presented even with haste, hold the attention of an audience for half to three-quarters of an hour and bring forth questions indicating not a little grasp of the subjects discussed.

Supplementing the lectures, it is advisable to offer a motion picture show. Stereopticon and motion pictures appeal to shop employees and their families and large and appreciative audiences are readily obtained either in the shop or at meetings under the management of employees associations which now exist among larger industries. Films are available from many sources. Our government, in co-operation with other governments, together with educational and industrial institutions, maintains at Washington a Bureau of Commercial Economics, which has a large series of films on most of the subjects of personal

and public welfare. The various state and municipal health departments and practically all of the state and national organizations for promoting health have series of pictures presenting strongly dramatic appeals on the subjects having their attention. The American Child Hygiene Association, the Social Hygiene Association, the National Tuberculosis Association, the American Medical Association, the National Housing Association, and others supply for a very modest cost sufficient material for a season of bi-weekly or monthly lectures.

A satisfactory series of lectures by the works' physician is difficult for the reason that most of our present-day industrial surgeons in small plants are part-time employees having neither the disposition, qualifications nor time to discuss community problems. Unfortunately again the physician is trained to individualism, seeing only the case and not viewing disease in its community aspect. His services are usually limited to advice to individual patients, and, if interested and conscientious, this service is of course valuable and to him is due the highest credit for the discharge of this responsibility. That there is an opportunity for the industrial physician to make a great contribution to the advancement of public health cannot be gainsaid. The work is clearly desirable; but at what cost and how shall it be brought about?

In 1916, the National Industrial Conference Board surveyed ninety-nine leading industries in an endeavor to ascertain the cost of health supervision in industry. It was disclosed that the cost incident to the care of 495,544 employees was $1,238,485, or $2.50 per capita. The budget of the New York Health Department is $3,957,-202.15, or in round figures, $4,000,000. The population according to the Bureau of Census, July 1, 1918, is 5,872,143, or roundly, 6,000,000. Hence it is that the per capita expenditure is about 67 cents. The population of Cleveland in the same year was 810,306 and its Health Department expenditure slightly less than $250,-000, or somewhat over 30 cents per capita. This lack of expenditure does not include, however, the maintenance of hospitals. If industry sees its way clear to make an outlay of $2.50 per employee, surely it is possible for the community to make a somewhat larger output and obtain returns wholly out of proportion to the sum expended by industry and that from the public funds.

It is clear, therefore, that there is an overlapping of effort with no inconsiderable waste of money. Experience has shown that there are three stages to the development of social movements: a period of agitation, a period of organization and a period of final incorporation of the desired order of things. It is obviously the time for beginning an agitation having for its object the centralization of public health education and control in some centralized governmental authority. This organization might well stand sponsor for such a movement. It is unfortunate that the present scope of function of the United States Public Health Service could not include the administration of compensation funds and other forms of social insurance likely to eventuate, which, in accord with the claims of their advocates, will react to the prevention of disease.

It is perhaps more courageous than discreet to suggest that business in its present attitude toward government control, complete or partial, of social or economic function, pool its interest in a small group of the community with that of the community as a whole. Nevertheless, with the advantage demonstrated, executives are quick to respond to the demands of the period. It would seem entirely feasible to consolidate the function of compensation commissions with that of national, state or municipal departments of health, or, if the principle of states' rights interferes, it would be workable to bring about co-operation between the agencies, with the point of contact resting upon the state department, to the end that their respective functions be applied to a single or at least to correlated effort which would make its impress on the whole community in the better understanding of the purpose and value of preventive medicine.

MALINGERING — INVOLVING THE PROBLEM OF GETTING THE SICK OR INJURED EMPLOYEE BACK TO WORK*

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MALINGERING may be defined as the conscious and deliberate feigning of illness or injury, or as the intentional exaggeration of symptoms. Some comparative zoölogists, after studying the animal kingdom, say that malingering is a form of self-preservation — an offshoot of fear. In the animals it is called instinct. If one stops to analyze the cases of malingering in respect to nationality, physiognomy, and mentality, there are evidences that this "instinct," as it were, is a real thing, and a trait which supports Darwin's theory of evolution. History and literature have recognized malingerers since the beginning of the world. The earliest instance known is recorded in Genesis, Chapter 31, Verse 35, where Rachel, in 1056 B.C. malingered in order to secrete the stolen idols of Laban. What boy in our day hasn't malingered in order to attend the ball game, carry water for the elephants, go fishing, or escape an unprepared lesson? While the problem is old, yet in these fast-moving days of industrial activity there are new aspects which must be considered. The various methods of malingering, the tests for its detection, and the training of the doctors for this special branch are food for later papers.

That admirable legislation known as the Workmen's Compensation Act, now operating in the majority of the states, has given us an opportunity to study closely the injured employee, and, where occupational diseases are included, has stimulated interest in the sick employee.

In justice to the workmen in general, I believe malingerers to be in the minority. The ideas brought out in this paper are for the purpose of detecting and curing an ulcer which causes the innocent to suffer, and by its cure will cause the honestly-disabled employee to receive all the honor, sympathy, and consideration due him.

The malingering employees may be roughly classed as:

A. Dishonest employees who say little.

B. Exaggerating employees who are less experienced and therefore voluble to make the most of their injuries.

"Fakirs"

The dishonest employees or "fakirs" are those who have a slight or no accident or illness. They report an injury and become immediately disabled. The doctor finds little or nothing upon physical examination, but, willing to be always fair, gives the employee the benefit of the doubt and sends him home. His disability becomes total, and on account of "pain" he says he cannot work. If he has a slight cold he reports sick and says the pain in his chest keeps him from work. A physical examination shows no evidence of illness.

Where settlements are permitted, as among longshoremen under the Admiralty Law, foreign labor is urged and often assisted to malinger by the "runners" or "shysters." Within the last three months I have seen the following malingering cases of this class:

1. B. C., aged 38, Italian, married, was lightly hit by a draft of boxes and was supposed to have injured his left shoulder. He went to a doctor, who treated him every day. Physical examination three weeks from the date of the accident for the purpose of determining the extent of disability, showed inability to raise the left arm and, upon palpation, a very tender shoulder joint. After various tests, no signs of fracture or changes in or about the joints were discovered. There was a mottled blue area of skin about 4 inches in circumference over the shoulder. The "bruises" were superficial and not deep. Investigation confirmed the suspicion that these "bruises" were caused by someone sucking the skin of the shoulder, and making what the boys call "fox bite." Had the man had a real injury the settlement would have been in proportion and the "runner" would have had a larger fee. In this case the employee was dishonest and the "runner" tried to assist him to be more dishonest with the hope for greater benefits.

2. P. Q., aged 46, Hebrew, married, claimed to be walking along a warehouse when he slipped on a banana peel. In trying to catch himself he bent backward and hit his head and the middle of his back upon some crates standing near. No one saw

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the accident, but a doctor strapped his back. When examined there was a blistered area of skin across the small of the back, which proved to have been made by a hot poker in order to fool the examining doctor. While his back was being examined, his clothes were dropped down about his ankles, and his hat placed upon the floor. During the examination he claimed inability to bend forward. Upon being left alone he was seen, through a peek slit from another room, to bend over, pull up his clothes and pick up his hat.

Flagrant malingering where the claimant is dishonest, unassisted, is seen as in the following cases:

1. M. N., German-born, aged 22, draughtsman, was injured in Niagara Falls. He claimed that while lifting one end of a drawing board he felt pain in both groins. Physical examination showed a large indirect inguinal hernia on both sides. He claimed never to have had a lump on either side before. He insisted upon operation by his New York family doctor and not the insurance company's doctor. His doctor used carbolic acid in mistake for novocaine, burned the skin from the boy's navel to his knees and he became sterile by the contraction of the scar tissue over the cords. Investigation showed that the drawing board weighed 12 pounds and his end, therefore, weighed 6 pounds. His could not have been a traumatic hernia. This malingering caused loss of services and money to the employer and much suffering with permanent disability for the malingerer.

2. M. M. was led in by a young girl. He stated he was 51, married, with his family in Italy, and had been burned in both eyes by live steam. He claimed to be able to distinguish light and dark only. External physical examination seemed to bear this out, except for the fact that his eyes quickly followed the dropping of a ring to where it rolled. While he was faced toward the window his coat was put on another chair, his hat hung in a darkened corner of the room, and his glasses changed to another position on the desk and partially hid by a paper. His ability and agility in finding them while talking about compensation led to his claim being rejected.

3. A young man, formerly an acrobat, aged 28, married, sprained his ankles while carrying a heavy chain. He returned to work in three weeks, compensation was paid and the case evidently closed. He apparently did the same and heavier work for nine months. Then he laid off and asked for a rehearing. Physical examination was negative, X-ray was negative, yet he held his feet almost rigid. Several doctors, including the chief surgeon of an accident board, could find no cause for his complaint that "the pain in his ankles was so bad he couldn't work." I could not elicit the usual evidences of pain, and finally had him kneel in a chair facing the back. His feet hung rigidly. Tapping the achilles tendons caused an unexpected free extension of the feet. This movement was not painful. This was one of the very few cases where I felt justified in testifying "this man has no pain." Despite the negative evidence, the board awarded compensation. Leaving the building, the employee said to me "I guess I didn't talk up to them enough. S. told me that he talked up and was given $3000 and I got less than $1000." After the settlement he had no further need for his cane.

Exaggeration of Symptoms

The second class is composed of employees who have been ill or injured so that the evidences are present upon physical examination, and yet who claim to be unable to return to work. In these cases the physical examination shows exaggeration of symptoms. The men decide not to return to work until they are as "fit as the day they quit." This class may be divided into (1) those who are in the age-group, 25 to 40, and (2) those who are in the age-group, 55 to 75.

The age-group from 25 to 40 contains many malingerers who desire time off because when idle they make more money, as for example, in the following case: J. C. belongs to several lodges or mutual benefit societies, whereby the total weekly benefits, including compensation, exceed his average weekly wage. His wife may also be working and adding her mite. In these days of high wages and comparatively low compensation benefits this class has fallen off in numbers, but in ordinary times these employees we always have with us. The men find it much easier to have free medical attention, to have high weekly benefits, and to be able to sit around and talk or read, than to have to work in order to earn the amount sufficient for their needs. This is especially so when the earning power is less productive than the benefits.

The age-group from 55 to 75 years — the winter season of life — usually contains men who own a little property purchased with their savings, and have rent practically free. They have children who are married, and any at home usually contribute, so that the income from compensation boards, lodges, and members of the family, with an occasional gratuity from the employer, is more than sufficient to feed and clothe the family. These men are satisfied to sit around and talk and do the chores, but when it comes to work they claim inability of all sorts. A good example of this class resides in the city of Buffalo. His history is as follows:

K. K., aged 62, married, with no children, while working for his brother as a carpenter, fell a distance of 10 feet and landed on both heels. He fractured

both heel bones. The injuries were promptly and properly treated. The slight swelling of the legs, common to inactive men of his age, appeared occasionally, and there was a slight deformity due to callous formation in the left heel. He was fitted with proper arch supports and shoes, baked and massaged, and after a period of total disability for fifty-two weeks, was told to return to work. The brother-employer was approached concerning re-employment of K. K. He said he thought K. K. should rest, and thereby prolonged the disability, because K. K. would "work for nobody but his brother." K. K. claimed pain in the muscles of his leg after standing awhile, and pain in the bones of his feet at night. He refused to try to do anything. Five years after the accident the examination revealed nothing more than the usual results of this type of fracture. Investigation proved that he owned his home, did the chores, cut the grass, cared for his garden, hoed the potatoes, and yet exaggerated his symptoms, so that the insurance carrier has paid him $15 per week for five years, with the prospect of paying him as long as he lives, and the chance of supporting his widow afterwards.

Statistics show that more employees malinger who are injured than those who are ill. This is probably due to the legal liability feature. If compulsory health insurance becomes a law, the American people will be astonished at the days lost through sickness in comparison with the days lost now. The curve will increase each year as it did with workmen's compensation. Malingering is harder to detect in illness claims. We will deal with our problem of returning the employee to work, with a tendency toward the accident feature. Necessarily this will involve problems of workingmen's compensation administration.

Problem of Returning a Malingerer to Work

The problem of returning the injured or sick malingerer should be attacked as the medical profession attacks diseases. The premise is that the disease is present. To treat it properly there must be a knowledge of the causes, the symptoms and signs of the illness itself, and the cure by (1) preventative measures, so that others will not be afflicted, and (2) the treatment of the diseased one by eradication of the symptoms.

A. As to the Premise there is no argument. No sane person doubts its existence.

B. The Causes of Malingering:

These are many, and because of their importance in treatment they should be mentioned in order.

1. *The Employee.* — Starting with the malingerer himself we must consider him as to his age, sex, education, and mentality.

Among foreign elements all ages tend to exaggerate and malinger, especially the Latin races. The American youth, except in rare instances, wants to be back at work as soon as possible. His future is before him. At about 50 years of age, a man begins to consider work as a means of existence and takes pride in his past achievements. He begins to feel that society owes him a rest and a pension, and exaggerates accordingly. Some older men, with the pride of years of service behind them, will drag themselves to work if possible that their record may not be broken. Men with such spirit are the real heroes of labor. Unfortunately human nature seeks rest as the sun of life sinks.

The influx of women workers during the world war has been too recent for reliable statistics. It would seem, however, that their ambition and ability to endure would result in far less malingering in proportion than among the male sex.

The less educated, the more lazy a man is. Conversely, as the mind improves its status so does the malingering become lessened. There seems to arise an ambition which refuses to be downed by ill luck. Therefore, lack of education is recognized as a cause of malingering.

The mental attitude of the employee is interesting on account of the motives discovered. (*a*) The employee may be revengeful and feel that his employer owes him more than the law provides, or that the prolongation of disability will tend to get even with the employer for some real or fancied wrongs. (*b*) He may be ambitious for attention, sympathy, and alms. All clinics have those who make regular rounds year after year. The hospitals, charity organization societies, churches, lodges, and various benevolent societies know this type well. (*c*) He may be defective mentally, and this type includes the fanatics, the convulsionists, the hystericals, imitators, and manic-depressive cases.

2. *The Employer.* — Employers may be divided into two classes for our purpose. (*a*) One class is composed of those who are too generous. They pay full wages for time lost, irrespective of compensation laws. In some few cases this would be extremely gracious and well deserved, but the temptation of nature to prolong disability is too strong in the vast majority of cases. (*b*)

The other class is just as close and indifferent as possible. While I was trying to induce a president of a large concern to introduce a sanitary lunch room, hospital, and first-aid organization, he said: "Why should I try to make it pleasant and safe for those fellows aside from my question of rate? The whole 5000 would walk out tomorrow and not think about me if an agitator trumped up some fancied wrong." Had he paid more attention to the men's comforts, organized safety-first units, learned a few men's names, dropped a smile or word of commendation here and there, or built up a brotherhood among the employees, there would be little economic loss through malingering. Personal interest properly exercised breeds loyalty among employees that even instinct cannot abuse very much. Keeping the employees informed as to statistics of work in past years for comparison, and accident frequency with loss in terms of sick or injured days, will go far to arouse an unbeatable pride in the workmen's hearts. A lack of interest on the part of the employer means a lack of proper follow-up methods and does much to favor malingering.

3. *The Industrial Accident Boards.* — These foster malingering by: (*a*) having no facilities for quick hearings in malingering cases as soon as they are detected. In some states it takes from two to six weeks to have a case appear on the calendar after application for hearing has been made. If detected, the malingerer knows he will be given consideration at least to the date of the hearings, which gives him added weeks of benefits, which he otherwise would not receive. Industrial accident boards foster malingering further by (*b*) urging legislation raising the amount of compensation indiscriminately. The man with a sore finger can do work of some kind where the man with a broken leg could not get out to look for it. The helplessness of the latter requires greater expenditures and should have a higher rate. In other words, a scale depending upon the degree of disability should be chosen. The simpler the injury, or the more undue the prolongation of an accident, in like proportion the smaller the benefits called for. The most worthy should be entitled to the maximum benefits. Malingering is fostered by high benefits. Accident boards foster malingering by (*c*) mixing politics and sentiment with business. Very few appearing before various state boards have not seen an elaborate staging of a case with relatives for supporting parts, in order to sway the board, and the subsequent sympathy cause a ruling not upheld by the higher courts. Many have seen union cards and political affiliations worked to the limit, because the law says that the board shall be the sole judge of fact. With proper "introductions" the malingerer is confident that the board may be generous. Again, boards foster malingering by (*d*) failure to prosecute perjurers or malingerers when so proven. This freedom from prosecution is a source of comfort to the malingerer. What has he to lose? Lastly, accident boards foster malingering by (*e*) failure to have a competent medical member of the commission, whose duty would be to arbitrate all medical cases. He would weigh the opinion of the chief medical examiner against the testimony of the insurance company's doctor, or the claimant's doctor. Malingerers could not then trust to the ignorance of a lay mind concerning the importance of the medical problems involved, or the symptoms presented.

4. *The Medical Profession*, sad to relate, contributes much toward malingering.

(*a*) Family doctors depend upon the families and their friends for their practice. They feel they cannot afford to get on the wrong side of any fence, consequently the malingerer preys on them for certificates of extended disability which the doctor can later usually back up with some kind of opinion. (*b*) Lodge and society doctors are in the same class and their reappointment the following year depends on the vote of the lodge. These doctors rarely perjure themselves for a few dollars, but they will stretch the truth. Malingerers get certificates comparatively easy from such men. (*c*) The shyster doctor, as well as lawyer, we have with us. To such, the truth means nothing and they trust to their personality to convince lay board members of a fearful and wonderful condition in the claimant. This type of doctor has his "price." (*d*) Incompetent doctors treating all manner of cases prolong and sometimes provoke disability unduly, and discourage the injured or sick. Thus they encourage malingering.

5. *The "Third Party."* — The so-called friendly enemy or runner who learns a few symptoms of disability and how to produce them artificially in some cases. This person, plus a natural malingerer, makes a hard

combination to beat. The runner is after his percentage and the higher the cost to the employer, the greater his profits.

C. The detection and methods of detection of the signs and symptoms of malingering will be left to the industrial surgeon or specialist in malingering. Suffice to say that the diseases having been proved present, we next consider the treatment.

D. Treatment.

1. *Prevention or Prophylaxis.* — This consists chiefly in correcting or removing the causes.

As for the employee; pension the faithful employees before they are added to the industrial scrap heap, stimulate pride in men to outdo the women in stick-to-it-iveness. Educate them at least to an awakening interest; determine the mental attitude by physical and social examination before employment and eliminate the mentally unfit. The moral and physical hazard of those employees in daily contact would be greatly increased if no defectives were allowed on duty.

The employer should be kind, gentle, courteous, and jolly, but firm and not unwisely generous. He should make the employees feel it is their business also, and each man is a spoke in the wheel which will not run smoothly if a spoke is missing. He should advocate employees' clubs, comforts, and organizations, and encourage them with his occasional personal supervision.

The industrial accident boards should have one-day emergency calendars presided over by a commissioner who is a competent surgeon and specialist in malingering; a fair scale of benefits so that the worthy receive their due; a high sense of honor as custodians of hundreds of thousands of dollars of employers' moneys; an understanding that politics and sentiment must be minimized in relation to business and the law, and the prosecution or assisting the district attorney to prosecute all malingerers and perjurers so proven.

The medical profession will from now on contain trained industrial surgeons. Progressive colleges are beginning the courses. These should supplant the family, lodge, society, shyster or incompetent doctor. These surgeons should be supported by industry, but not subservient to it.

The boards and employers should refuse to discuss a case wherein there was a runner or shyster lawyer. These vultures prey upon the laborer's ignorance of his rights under the law and demand a percentage of that to which the law says the laborer is entitled. There is no need for the runner and he should be eliminated.

2. *The Active Treatment of Malingering.* — The problem resolves itself into the fact that these employees are lingering and loitering on the threshold of industry. How best to encourage their voluntary return?

(*a*) Starting at the beginning of employment the application blank should have these questions on it:

1. Have you had any previous accidents? Explain.
2. Have you had any previous illnesses? Explain.
3. Are you now in good health?

A malingerer is not necessarily a *good* liar, for a good liar remembers his previous story.

(*b*) There should be a careful physical examination before employment. Defects can be noted so that minor injuries cannot be amplified.

(*c*) Accidents or illnesses must be reported by someone within twelve to twenty-four hours after occurrence or they cannot be considered. Employers should be protected by the law in this. A physician makes an immediate examination and controls the case, then a smashed finger at home cannot be charged to industry; a gonorrheal joint cannot be referred to a strain two week previous; lumbago cannot be called sprain at work. Of course where eye particles give trouble next day, or infection sets in three days after a scratch, there are definite signs of presumptive injury while at work.

(*d*) Proper organization.

1. Chief surgeon. A trained industrial surgeon who has specialized in malingering. He should have a pleasant and forceful manner, be a business man and well read. He must have a convincing manner on the stand and have tact.
2. Assistants, as many as necessary, to treat all injured men immediately upon report of accident or illness, and to make thorough examinations before employment and at any time where necessary.
3. Nurses who can pleasantly jolly a malingerer, and if possible shame him into going back to work.

4. One or more social service nurses, male or female, to check up and investigate any suspicious action or questionable testimony. These nurses should have a claim training so that they know a few details which they could attend to when necessary.

(*e*) Proper system.

A system to lessen malingering could be used as follows: —

As soon as an employee reports ill or injured he has prompt attention by a doctor. The doctor's report, estimate of disability and history of the case seen the previous day, is filed every morning. The employment card is attached to his history and physical examination card and becomes part of it. These cards or files go to a doctor for comparison. If the case looks legitimate, the treatment continues until disability from that illness or injury ceases. The file then is placed back in the filing system and the case closed. If the case looks questionable, the facts are investigated by the social service department and action taken accordingly.

If the claimant later tries to reopen his case claiming all sorts of symptoms, he can be confronted with his previous well-kept record.

If disability lasts over four weeks the case automatically goes out of the assistant's hands until the chief surgeon shall have made an examination and report. The chief's word is final; the man goes to work or receives further treatment — general, operative, or reconstructive. This gives also the advantage of the chief surgeon's being able to watch the work of his assistants. At any time an employee is thought to be malingering, the report should be made confidentially to the chief surgeon.

The scheme may be expanded into the realms of state medicine. It may also grow into a clearing house for information concerning dishonest employees, such as the life and accident and health companies support. When an employee is dishonest to the point of malingering he should be known, that the honest employees be not made to suffer by his actions. This would reduce the number of so-called " traumatic hernias " alone, so that the saving in this one type would pay for the bureau.

This scheme is also applicable to any group of employers or insurance carriers in any one city where the individual system might be too expensive for any one employer.

(*f*) Proper punishment.

A firm hand by the industrial boards in dealing with malingerers is essential. It matters not whether benefits are cut off on the date the employee should have shown his good will and attempted to resume some work upon the physician's advice, or on the knowledge that detection of malingering will certainly be punished by the boards or courts — the employee who is faking will fear the consequences. Fear goes a great way to keep people straight who otherwise might be intentional malingerers. This fraud is the meanest of all and should be severely dealt with.

(*g*) Expert diagnosticians.

This group would include a well-paid medical commissioner, skilled in industrial medicine and surgery and in the detection of malingering, and well-paid chief medical examiners.

Employees may have their own opinions, but they cannot seem to learn that working, after certain disabilities, will do more for them than medicines or treatment in hastening a cure. The difference between the patient's visiting his own doctor and being examined by the commission's expert is that in the former case the patient seeks advice, while in the latter case the patient squeezes symptoms to fit the condition. The former doctor is perhaps biased. The expert is unbiased, and while giving the employee the benefit of the doubt, he is an administrator of justice to all, especially to that great class of honest employees who say: "I don't want anything for myself. I want a good body and to get back on the job."

The expert should be acquainted with industrial conditions so that his judgment as to a finger injury would be fair to a tailor, or watchmaker, while the same injury would be less disabling to a foreman or driver, and the return to work order should accordingly be influenced.

The expert should study the individual and know character. He should know when to agree with dishonest complaints and when not to agree.

He should have a fair knowledge of decisions of state boards and courts in various types of cases, as his questions and the answers thereto may prove of great value to the commission in legally interpreting a malingerer's statement.

Finally, he should have a thorough knowledge of pathology. This is essential

to account for many of the symptoms alleged by a malingerer. It is of untold value in the hundreds of tests to check malingerers. That is something of which the malingerer knows nothing. This will stop the testimony of unscrupulous doctors concerning a wonderful pathological condition, purely invented in the hope that the lay members of the board will give the patient the benefits.

Conclusions

In attempting to recognize the disease, investigate the causes, and treat the condition, there has been one point in view — that of returning the sick or injured employees, who tend to malinger, to work in the shortest time consistent with good recovery. This saves an economic loss to the employer and protects the honestly-disabled employee, who by reason of his honesty should profit in proportion as the malingerer should suffer. The American spirit is justice for all. Stress has been laid on well-trained industrial surgeons. This is because, in my opinion, few mistakes could be more serious or do more real harm than to stigmatize an honest man a malingerer. It is possible by proper methods to prove malingering. At the point of doubt the medical commissioner is essential and his opinion should prevail on all medical questions. A number of malingerers get surprisingly well before they will be examined by the chief surgeon or medical commissioner.

The malingerers cause the medical profession making impartial examinations to view any case with suspicion until proven innocent. If we can minimize the number of malingerers we shall have done much for the honest sufferer. We shall also save the toiler from moral degradation which follows misspent time and unearned income. The detection of malingering is a highly specialized branch of medicine, for by it society pays its just debts, fraudulent claims against innocent parties are prevented, and industry receives back the men as useful members instead of their being leeches on society.

BOOK REVIEWS

Commercial Tests and How to Use Them. By Sherwin Cody. Paper, pp. 238. Yonkers-on-Hudson, N. Y.: World Book Co., 1919.

This is a manual of the standardized tests of the Business Standards Association (formerly the National Associated Schools of Scientific Business), and it is an outgrowth of the work of a joint committee of the Chicago Association of Commerce and the Board of Education, first reported in 1913, and since extended by national organization. A brief account of the organization and of its preliminary bulletins and series of tests is given. The book contains introductory chapters on tests as a scientific basis for school marks, for estimating progress, and for measuring practical ability, but the greater part of the space is given to a full description of the tests. No statistical data are presented, and the mathematical treatment of the tests is confined to some practical directions for recording and scoring the results.

The tests are eleven in number, with two series given for each test. They include: (1) a test on tabulation, in which items specified by three factors are selected from a mixed series (chosen with some reference to its value as a test of mental alertness); (2) reproducing instructions, the subject being required to comprehend and reproduce the details of a complex order; (3) test on invoicing, which comprises entering of a business transaction in proper form; (4) fundamental arithmetical operations, tested for speed and accuracy; (5) tests in business arithmetic; (6) tests in English, including spelling and grammar; (7) elementary test in letter writing; (8) test on answering letters; (9) stenographic test; (10) test on copying for the mimeograph; (11) test on addressing envelopes with a pen, and on filing. Each test has been definitely standardized, and full materials and directions are given for every step in the process of testing and grading.

The usefulness of such standardized examinations for business ability cannot be questioned, and the methods explained in the book are obviously far superior to the ordinary methods of grading in schools, but the question will be likely to be raised by some psychologists whether tests could not be devised which, by following less closely the routine processes of the school and the technical work of the office, would be to a greater extent tests of ability as contrasted with the special erudition of business. This problem is not entirely overlooked by the author, since some directions are given for estimating general ability from the results of the tests, but this might well have been extended and brought into closer relations with the standard methods in use for testing general ability. At least one must recommend to the amateur business psychologist that, in using such a manual as this, he familiarize himself with the current methods of measuring intelligence.

In the actual employment of commercial tests, a system must of course be arranged and applied in such a way that the effects of intensive work for a short period will not offset or hide general disqualification, and also that defects in incidental teaching will not conceal potentiality and capacity for progress. If actual present knowledge and control of the specific processes employed in business are what the business man desires most to measure, standardization of tests in direct relation to these processes, such as this manual carries out, is highly practical and effective and, at least for rough estimates of the lower grades of business ability, sufficient criteria (the amount and character of training being known) may perhaps be obtained from commercial tests of this type.

This book ought to be found in the library of every employment department and to be thoroughly understood by all teachers of commercial subjects. — *G. E. Partridge.*

The Creative Impulse in Industry. A Proposition for Educators. By Helen Marot. Cloth. Pp. 146. New York: E. P. Dutton & Company, 1918.

The vocational and industrial school movement is too circumscribed by industrial thought; educators oppose the control of such schools by industrial enterprise, fearing that the students will be exploited by business interests; on the other hand, education must be vocational in order to keep in touch with real life problems. Germany has developed a great system of industrial education. Before the war many were in favor of its most efficient methods, not seeing that its paternalism was the token of an enslaved people, not seeing that children were being sacrificed to an industrial institution for an imperial purpose. But now our eyes are opened and we must see that the efficiency we strive for is not to make an empire, not to pay immediate dividends, but to develop man's desire to do creative work. The creative process is the educative process.

Modern business enterprise and machine technology have extinguished the joy of the creative experience; craftsmanship is a thing of the past; an article owes its existence to an infinite number of persons, and a worker's claim to the product of his labor is merged in an infinity of claims which totally impersonalizes industry. The worker has become a mere factory attachment and surrenders himself to the rhythm of the machine. Thus creative desire has been lost and the only reason left for laboring is the predatory desire to possess wealth — to "get paid off" and do as little work as possible for as large a reward as possible. Division of labor is not as bad as it seems, however, for it offers the workers the possibility of extensive social intercourse and the opportunity to work out a co-ordinated industrial life.

The American way of adapting labor to industry has been the assumption of detailed control by the management, leaving to the worker only a set of instructions which he is to follow blindly. To compensate for robbing the worker of initiative and con-

tentment in his work the management introduces " welfare work "; but even this humanitarian " slop-over " of the scientific manager does not keep the man from slacking, being perverse, or throwing over his job. At least scientific management is honest and the worker is under no delusion that he is working on his own initiative. The stupidity of the situation lies in the belief by the managers that the workers lack initiative and that the pay envelope satisfies all their desires. The development in this direction is the recent desire of labor to assume responsibility for administration whether industry is publicly or privately owned.

The German way of adapting labor to industry has been to educate the children, sort them out at the age of ten, and at that time practically determine their future social and economic status, this to be followed up by several years of special training, giving no opportunity for any element of waywardness or free choice. They are taught to accept methods and not to doubt authority. The necessity for Prussian imperial position inspired the surrender of German schools to the needs of the German manufacturer. The school children were exploited for the needs of the state; they were given the ideal of service to the state as the great incentive, and because machine industry was imposed ready-made on a people whose psychology was feudal, the method was remarkably efficient.

The last chapter in the books is constructive and outlines a plan for industrial education as opposed to industrial training, the prime object being to keep the creative instinct alive. The school is to be an experiment to determine whether through education the creative experience may be enjoyed in association with other workers in spite of the division of labor. To accomplish this the worker must be given a true participation in productive enterprise and must be shown that " there are adventurous possibilities in industry outside the meagre offerings of the pay envelope. Without question, it is the business of educators to determine whether such features of industry as machinery and the division of labor are fundamentally opposed to growth or whether they are opposed only in the way in which they have been put to use and directed." — *Stanley Cobb.*

Recreation for Teachers: or the Teacher's Leisure Time. By Henry S. Curtis. Pp. 288, with illustrations. New York: The Macmillan Company, 1918.

Dr. Curtis has presented his subject in an unusual and original way, and his book invites comment from several points of view. It is, first, a sufficiently systematic study of the requirements as regards recreation — or, more broadly, life outside the routine of work — of an exceptional profession of which about half the members, according to certain statistical studies, suffer from some form of " nervous trouble." The excessive wear and strain of the work of teaching and the long periods of freedom from work common among teachers, make the hygienic problems of this profession peculiar. At the same time, Dr. Curtis insists, the general plan of life outlined for teachers is suitable in essentials for all professional workers. In this plan, recreation takes rather a larger place than we are accustomed to give to it, but the author has, in his own mind, so interwoven the idea of play with that of work that he has avoided the extreme of pleading for too much play for play's sake, and also the other extreme of trying to justify the inroads of play by always making it practical. Practicality is sought in the total result, while the play instinct is satisfied by the spontaneity of life that the author is plainly trying to show the teacher how to acquire, both in work and in play.

If in presenting the problem of hygiene in this unconventional way the writer sometimes descends to the commonplace, he does succeed in suggesting, out of an abundance of experience, what he is trying to convey — an ideal of a larger life for the teacher which is full of the spirit of nature and in which hygiene as such falls into the background or becomes a part of natural living. The book seems to be wholly free from the hobbyism that we often find in books on health that depart from the beaten path. One could wish heartily that every profession and occupational group could be submitted to a similar examination by investigators having as wide a knowledge of the conditions and requirements as has been brought to bear upon this study.

The book contains some new data: statistical summaries in regard to the prevalence of diseases among teachers as compared with other groups; and a variety of special investigations, largely by questionnaire, of the activities of teachers, which show, on the whole, narrowness of life and lack of ability to make the best use of opportunities or to react from the peculiar effects of the fatigue and routine of the work of teaching. A wide range of topics is covered. After some general considerations of play and of teaching and of the special needs of teachers, the recreational resources of teachers are discussed under such captions as After School, Saturday, Sunday, Week-Ends, The Teacher's Institute, The Summer at Home, Summer Work, Summer Teaching, Summer Play, Recreation at Summer Schools.

Life out-of-doors and a higher living through the senses as contrasted with mere activity are the writer's persistent themes. The book has an Emersonian touch, and there is an occasional bit of philosophizing worth remembering, such as that " friendships do not grow largely out of work but out of play," leading one to consider what else can be introduced into the occupational life only through the medium of play. — *G. E. Partridge.*

British Labor and the War: Reconstructors for a New World. By Paul V. Kellogg and Arthur Gleason. Pp. 496, including 153 pages of appendix. New York: Bone and Liveright, 1919.

This book should be of particular interest to those who are following the present trend in the labor movement in England. Its aim is to show how a new constructive labor policy grew up during the war to supersede the old established trade union idea. The authors are Americans and present their material from the standpoint of the outsider, though always from the standpoint of the outsider who is sympa-

thetic with labor. Those in this country who have felt that recent tendencies among British labor give signs of social and political disintegration, will obtain a new view of the possible currents of thought and motive underlying the changes which are in process. The book does not at any point consider the possibility that the fundamental trend of thought among British workers can lead to anything but a new era of industrial and political democracy. This new democracy will be evolved, rather than set up, by such a change as has come in Russia. A great deal of reliance is placed upon the good sense of the Britisher who has in the past successfully carried on bloodless revolutions of various types.

Up to the fall of 1917, British labor had developed no unit front on policies of war and later reconstruction. With the statement of war aims adopted at the joint conference of the Trades Union Congress and the Labor party in December, 1917, however, a definite policy was established to which labor could look for such a termination of the war as would protect it in all countries from a recurrence of a similar catastrophe. This Statement of War Aims offered a common ground upon which all labor could be drawn together in England. With the growth of unity on the larger issues of the war in England, labor's next step was to establish a similar understanding of war aims among the workers of the Allies. The Inter-Allied Labor and Socialist Conference of February, 1918, was, as its chairman stated, "the first occasion on which the workers had unitedly evinced a determination to take a dominating part in the issues of war and peace." Growing out of the deliberations of this conference was the Memorandum on War Aims which, based upon the Statement of War Aims of the conference of December, 1917, emphasized the fundamental need for insuring the safety of democracy throughout the world, and went into some detail on the question of the settlement of territorial disputes arising out of the war.

The third phase of labor's offensive in the war was "to get their conception of an unimperialistic settlement before the workers of the Central Empires." In accomplishing this latter purpose, labor found a great ally in President Wilson toward the close of the war, when he appealed directly to the people of the Central Empires.

Along with the development of a war policy, British labor was laying the foundation for marked changes in its relation to industry and to the government. The new industrial movement "claims that the producer must control production." The new political movement "deals primarily with man, the consumer, rather than with man, the producer." The one deals with management of production, the other with the nationalization of the means of production. Out of these new trends have grown the shop committee movement and the growing demand for nationalization of such resources as mines.

With the entrance of the United States into the war, British and American labor interests became more closely connected. On most points of war policy Mr. Gompers, on his visit to England in September, 1918, could agree with British labor. The American Federation of Labor, however, would not "meet the representatives of enemy countries until the war had been won." The majority of British labor distinguished sharply between the autocracy and the workers of the Central Powers, and under certain conditions was willing to confer with representatives of the latter, even while the war was in progress.

While the authors of this book are most interested in happenings, the closing chapters look toward the future as it promises a new democracy for workers. One of the most valuable parts of the book is the appendices which present a series of memorable documents which have grown out of the new attitude of labor toward itself and its environment.

Much of the subject matter of the book is composed of quotations from speeches and writings, so that the discussion deals extensively with original sources. While this gives much weight to certain chapters, it tends to make the book somewhat lengthy and, at times, slightly confusing to the casual reader. Although the avowed purpose is to present labor's story, one wishes that its activities had not been so completely segregated from those of other forces which also played their part in winning the war. The book, however, is well worth reading and presents a great amount of information which impresses the reader with the feeling that out of the apparent confusion of immediate reconstruction will come a new and altogether more satisfactory order of things. — *Charles H. Paull.*

Health Education in Rural Schools. By J. Mace Andress, Head of the Department of Psychology and Hygiene, Boston Normal School. Pp. 321. Boston: Houghton Mifflin Company, 1919.

Dr. Andress has produced a very useful book. It claims little or no originality as regards new research, but as a text-book in the field of popular hygiene it is excellent. Although it is especially adapted to the work of the teacher in a rural community and treats specifically some of the problems of the country, in all essentials the study is general and both in text and references is suitable for the use of all who are interested, in a practical way, in the health of children.

The question of the comparison of the health and sanitariness of conditions in country and city Dr. Andress treats by accumulating the available data. The old view that the people of the country are healthier than those of the city and that conditions are necessarily better in the country is now discredited, or at least the relations have become changed. Health surveys within a few years have shown not only that there is even a greater amount of physical defect in the country, but that housing conditions are bad, and even overcrowding is prevalent. The results of the draft have confirmed these conclusions to the extent of showing that men from the country are as likely to be physically defective to a degree sufficient to exclude them from military service as men from the city. The fact that a great proportion of the defects found might have been prevented by ordinary hygienic conditions and such

care as can now readily be provided in a routine way through the schools, encourages us to redouble our efforts and to extend vigorously our preventive resources to include the schoolchildren of the rural communities, who now constitute three-fifths of the school population of the country. At the present time there is but little teaching of hygiene in the country schools, and, in fact, the health of the children outside the cities is to a dangerous degree neglected. Draining away of the more vigorous stock of the country into the industrial life of the city is also having the effect of causing deterioration in country life and depletion of its vitality. — *G. E. Partridge.*

Education in Accident Prevention. By E. George Payne, Ph.D., President of the Harris Teachers College, St. Louis, Missouri. Cloth. Pp. 149 and index, with illustrations. Chicago: Lyons & Carnahan, 1919.

This small but very important book is designed to show " how accident prevention may be made a part of regular school instruction without the addition of another subject to the curriculum." Too much credit cannot be given to the National Safety Council for their enterprise in providing for such a publication and to Dr. Payne for the able manner in which he has constructed the book.

The first chapter, *The Economics of Accident Prevention*, is of value to all interested in industrial hygiene. It gives most cogent reasons for the entire safety movement. Following this are general chapters upon the scope of the work and the importance of inculcating careful habits as regards safety. The need of making such habits a social duty is emphasized. How important such teaching may be, comes home to all of us when we consider the delight in taking risks which possesses most children. To place such tendencies in a class with lying and thieving is an important duty for modern society.

Following this general outline of the subject are suggestive chapters on *Teaching Accident Prevention through Language Instruction*, *Accident Prevention through Drawing*, *Accident Prevention in Arithmetic Instruction*, and *Accident Prevention in Other Subjects*. It is, of course, clear that any campaign against accidents which is to be successful with children must treat of fields that they can appreciate. But it must be of certain benefit to industry if eventually it receives workmen who have started to be careful in the days of their earliest impressions. Such individuals will not need to be taught industrial accident prevention. They will enforce it and will cause the safety movement to spread from within. — *C. K. Drinker.*